Are You

MEETING TODAY'S PEAK PRODUCTION DEMANDS ON EVEN TERMS WITH YOUR COMPETITORS?

When *production* is the paramount consideration, as it is today—are you equipped to *produce?* And can you meet continually mounting schedules at a profit . . . do you enjoy completely dependable equipment . . . does your wire-drawing machinery provide the speed, flexibility and versatility *you must have* to hold and improve your position as a reliable source of supply?

These pertinent questions are answered in the affirmative it your mill is Vaughn-equipped. Vaughn Wire Drawing Machinery gives you an even break with Vaughn-equipped competition—and an invaluable lead in the race over those who are handicapped by lesser productive facilities.

A Vaughn representative may be an important man for you to meet right now!

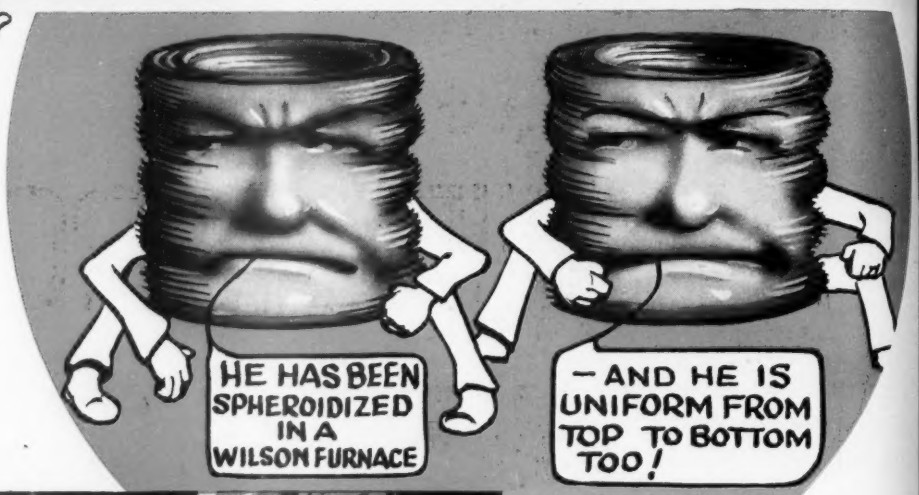
THE VAUGHN MACHINERY CO. CUYAHOGA FALLS, OHIO, U.S.A.

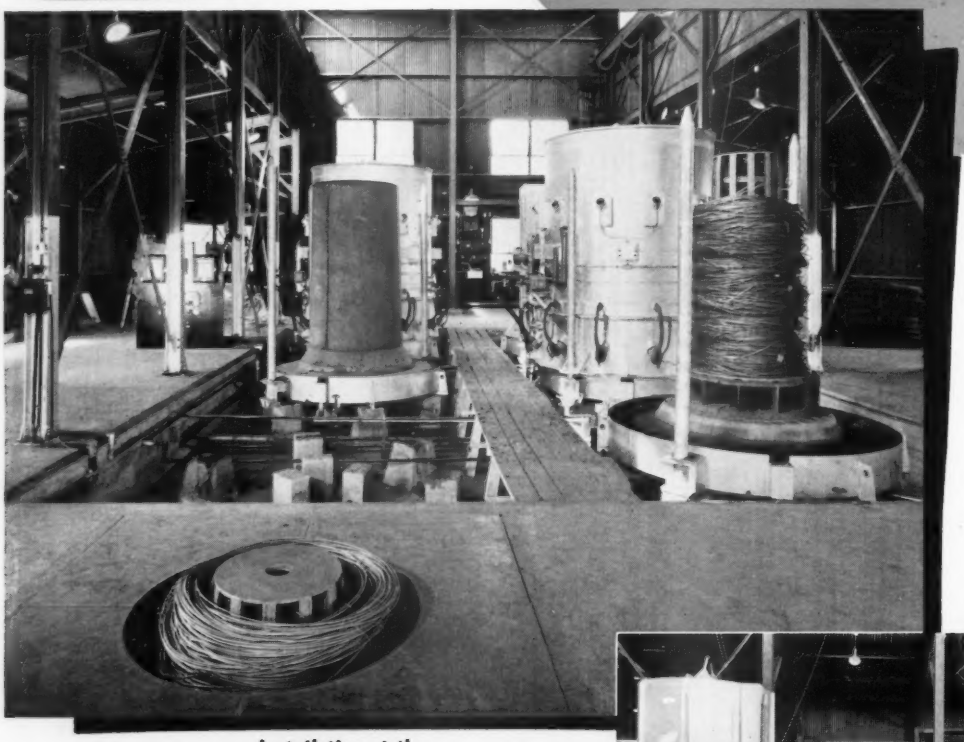
VAUGHN

WIRE DRAWING MACHINERY

COMPLETE WIRE DRAWING EQUIPMENT . . . CONTINUOUS OR SINGLE HOLE . . . FOR THE LARGEST BARS . . . FOR THE SMALLEST WIRE . . . FERROUS, NON-FERROUS MATERIALS OR THEIR ALLOYS

WILSON CYLINDRICAL BELL TYPE FURNACE FOR ROD and WIRE





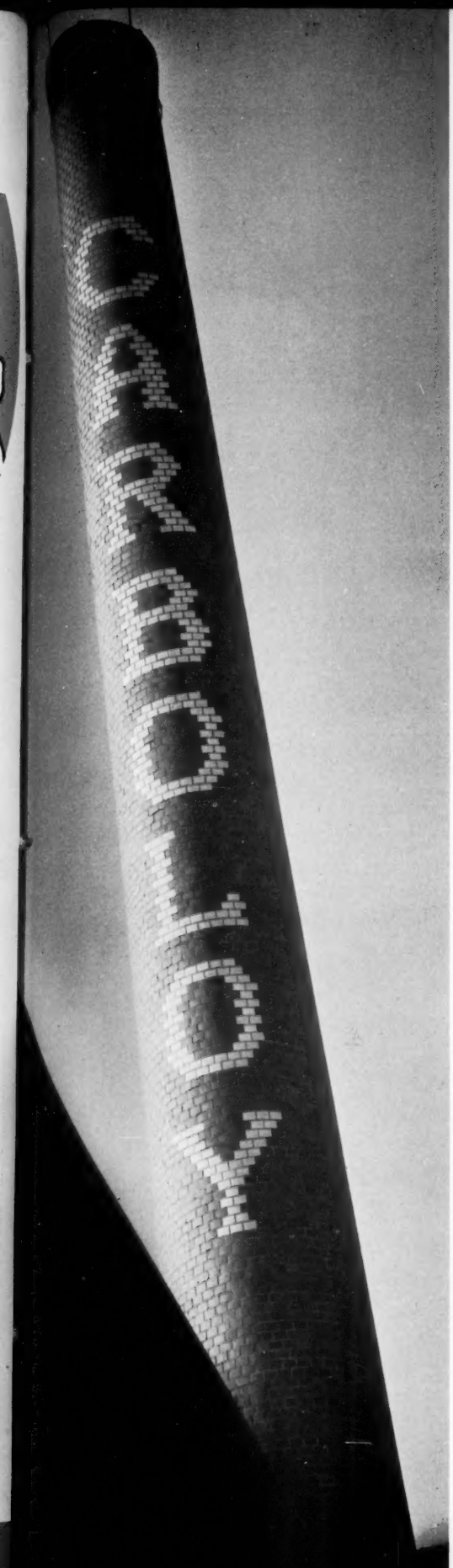
THE very best coils of steel rod for cold heading operations come from Wilson Furnaces.

Installation at the
National Screw & Mfg. Co., Cleveland, Ohio

The Wilson Annealing Unit is covered by Patents Nos. 1952402, 2068477, 2078356, 2081612, and other patents pending.

An Exclusive Development of
LEE WILSON ENGINEERING CO.
1370 Blount Street • Cleveland, Ohio

SEND for the new Annealing Catalog showing typical installations of Wilson Annealing Furnaces.



Reserve Capacity

To meet sharply Increasing Demands For CEMENTED CARBIDES

To help industry meet the requirements of the nation's defense program, Carboloy Company, through its recently consolidated and enlarged manufacturing facilities, stands ready to meet all unusual demands that may be made upon it for cemented carbides. That such demands will be made is indicated by the fact that during recent months Carboloy metal production has rapidly risen to approximately double that of previous months.

The extent of our existing facilities is such that we can continue to quickly meet enlarged demands for cemented carbides, and these facilities are being further supplemented by additional equipment.

CARBOLOY COMPANY, INC.
DETROIT, MICHIGAN

CHICAGO • CLEVELAND • NEWARK • PITTSBURGH
PHILADELPHIA • WORCESTER, MASS.

Authorized Distributors: Canadian General Electric Company, Limited, Toronto, Ont.
Hartley Wire Die Co., Thomaston, Conn.

TUNGSTEN CARBIDES ★ ★ *TANTALUM CARBIDES* ★ ★ *TITANIUM CARBIDES* ★ ★

RODS

ANY ANALYSIS
ANY FINISH
ANY TONNAGE

Bethlehem can promptly fill your order for rods in the exact analysis, treatment, and finish you desire, regardless of how large or specialized the order may be. Bethlehem rods are uniform in grade and quality. They draw smoothly, fabricate well, and insure maximum durability in the finished product.

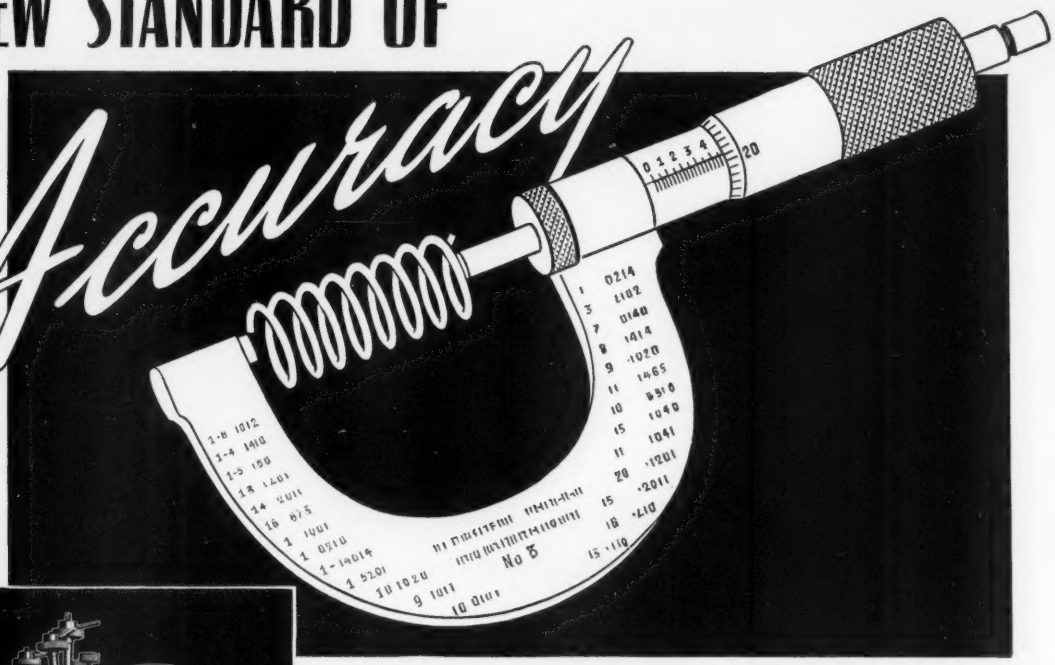
Two modern mills, a staff of field-trained metallurgists, and 51 years of experience in making steel for wire-drawing, combine to supply you with rods of unvarying high quality and to ship them with minimum delay.

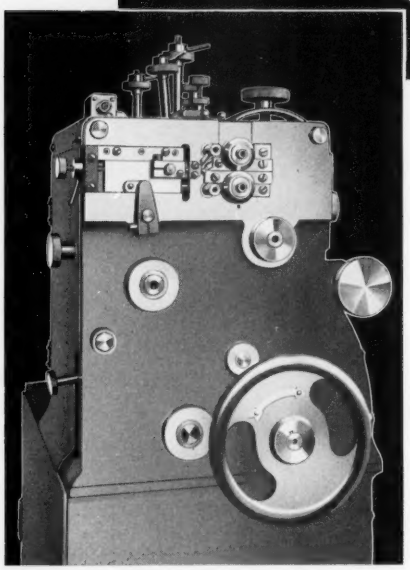
Ask a Bethlehem field engineer to stop at your plant for a talk on rods. The suggestions of these trained men have helped turn many a "get-by" business into a real money-maker.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

A NEW STANDARD OF *Accuracy*





FOR SMALL SPRINGS

Torrington W-100 Coiler motor driven with Variable Speed Transmission and gears for 24″ of wire.

One set of gears giving 0″ to 16″
One set of gears giving 0″ to 23.4″

Size of wire .003″ to .015″ Dia.
Largest coil ¼″ L. D.
Production—50 to 400 springs per minute.
Motor—½ H.P. 1200 R.P.M.

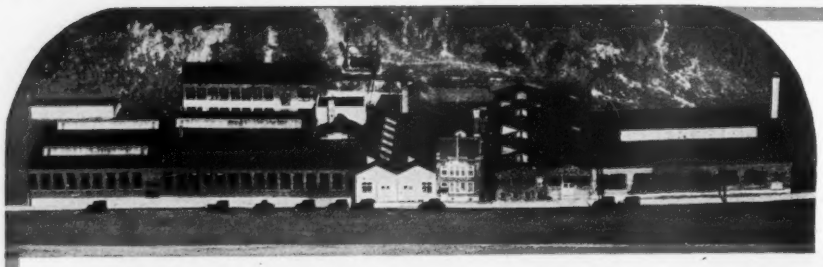
The new Torrington W-100 spring machine features extreme accuracy with continuous high speed production on wire under .015″ in diameter. Construction details are comparable in every way with the well-known high quality of the larger units in the Torrington Spring Machine Line.

Springmakers everywhere are discovering that Torrington Spring Machines meet their every demand . . . exactly. For increased output per machine hour, and for new and higher standards of accuracy, investigate Torrington Spring Machines TODAY.

Spring Making Machines by

TORRINGTON

ENGINEERED AND MANUFACTURED BY THE TORRINGTON MANUFACTURING CO. of TORRINGTON, CONNECTICUT



HUDSON WIRE CO. PLANT AT OSSINING, N. Y.

HUDCO

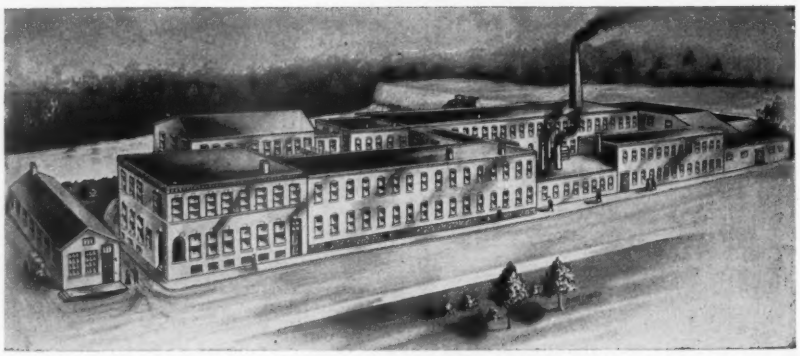
FINE WIRES IN ALL METALS

TWO MODERN AND COMPLETE WIRE PLANTS—— AT YOUR SERVICE——

LET US QUOTE ON YOUR WIRE REQUIREMENTS

WINCO

LEAKPROOF ENAMELLED WIRE



Winsted Divn. of HUDSON WIRE CO. at Winsted, Conn.

HUDCO

FINE BARE WIRES

High Brass, Low Brass, Zinc 99.99+ and High Tensile Zinc, Commercial Bronze, Phosphor Bronze, Pure Tin, Lead, Antimonial Lead, Tinsel Lahns, Silver Plated Copper, False Gold and Copper.

Cadmium, Nickel Silver, 10%, 18% and 30%; Silver Plated Copper, False Gold and Special Brass and Bronze Alloys to Specification, Metallic Fibre for Packing Purposes, Copper, Bronze, Zinc, Lead and Aluminum.

WIRES FOR METAL SPRAYING

Pure Lead, Lead Alloy, Pure Zinc, Zinc Alloy, Copper, Tin, High Brass, Low Brass, Solder Wire, High Conductivity, Electric Wire.

Cadmium, Nickel Silver, (10%, 18%, 30%); Aluminum, Monel Metal, Phosphor Bronze, Pure Nickel, Commercial Bronze.

"HUDCO" specially processed Copper Wire for enamelling purposes is drawn from Selected Copper, insuring the maximum conductivity. This is but one example of the use of the most advanced and approved materials and methods in our processing. BETTER WIRE AT LOWER COST.

LET US QUOTE

HUDSON WIRE COMPANY

OSSINING, N. Y.

SUCCESSORS ROYLE & AKIN

ESTAB. 1902 ESTAB. 1902

WINCO

LEAKPROOF ENAMELLED WIRES

Drawn from special oxygen-free copper that works so clean, so free from slivers, that enamelling is perfect. Leaks positively prevented. Every foot of WINCO enamelled wire is mercury tested before shipment to assure a wire perfect in every particular.

WINCO enamelled wire is covered to the same dimensions as fabric-covered wire so the user need not change his equipment. It will withstand softening in varnish-dipping and baking.

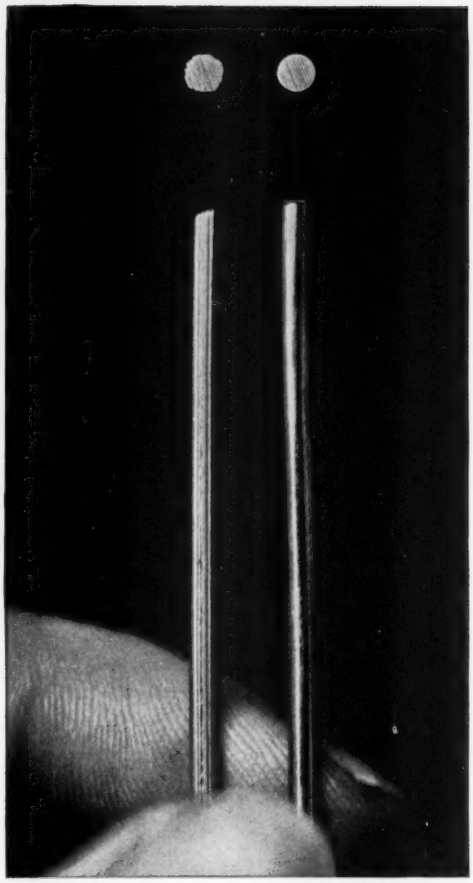
WINCO enamelled wire is lower in cost than silk covered wire. Write for sample.

LET US QUOTE

WINSTED DIVISION

HUDSON WIRE COMPANY

WINSTED, CONN.



These unretouched enlarged photographs of wire specimens furnished by a customer show graphically the importance of using Tantalum Carbide Dies when smooth finish is desired. The wire at left, badly grooved and out of round, was drawn through a tungsten carbide die. The wire at right was drawn with a Vascoloy-Ramet die which had been in active service the same length of time as the tungsten carbide die, operating under identical conditions. The wire is No. 13, B & S Gauge, 92% copper, 8% tin.

PROOF

TANTALUM CARBIDE Draws Smoother WIRE

Nobody, of course, intentionally draws wire so badly scored as that shown in the illustration. To avoid such wire, dies are refinished or discarded.

Much of this refinishing and replacement cost, to say nothing of rejected wire, can be avoided by using dies containing Tantalum Carbide, which permits finer finish on dies and imparts finer finish to wire throughout the entire life of the die.

The same properties of Tantalum Carbide which have won universal recognition in cutting tools are equally important and beneficial in wire dies.

To be sure of dies containing Tantalum Carbide, use Vascoloy-Ramet dies.

Vascoloy RAMET

TANTALUM-TUNGSTEN CARBIDE

DIES

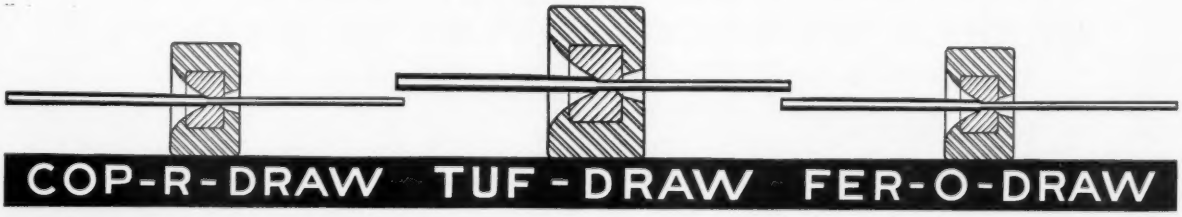
VASCOLOY-RAMET CORPORATION

NORTH CHICAGO, ILLINOIS

Factory-Owned Branches:

JERSEY CITY **DETROIT** **CLEVELAND** **PITTSBURGH** **CINCINNATI** **HARTFORD** **PROVIDENCE** **PHILADELPHIA**

In Canada: Carbide Tool & Die Company, Ltd., Hamilton, Ont.



TEN TIMES!

Hundreds of Prospects:-

THE KIND OF PROSPECTS YOUR SALESMEN DREAM ABOUT—RESPONSIBLE, TRAINED, KEY MEN IN THEIR PLANTS—WITH OVER 90% OF THE AMERICAN AND CANADIAN ROD, WIRE AND WIRE PRODUCTS PRODUCTION DEFINITELY UNDER THEIR CONTROL AND SUPERVISION.

▲▲▲

FOR THE *TENTH TIME* ON OCT. 21, 1940 —

THE WIRE ASSOCIATION

WILL BE ASSEMBLED IN ANNUAL MEETING—

"to improve production methods and afford a clearing house for ideas * * * * * and to maintain friendly relations among members."

▲▲▲

Reach this Market—

THE SPECIAL CONVENTION ISSUE

OF

WIRE AND WIRE PRODUCTS

WILL CARRY PREPRINTS OF ALL PAPERS TO BE PRESENTED AND DISCUSSED AT THIS MEETING

▲▲▲

YOUR USE OF ADVERTISING SPACE IN THIS SPECIAL OCTOBER ISSUE WILL RESULT IN SALES OF YOUR PRODUCT, EQUIPMENT, SUPPLIES OR SERVICES.

RESERVE YOUR SPACE AT ONCE

WRITE

WIRE AND WIRE PRODUCTS

300 MAIN ST.,
STAMFORD, CONN.

TENTATIVE PROGRAM (Subject to Revision)

WIRE ASSOCIATION ANNUAL MEETING, Cleveland, Ohio, October, 1940

Technical Papers Will Be Preprinted in the October, 1940 Issue of Wire and Wire Products

✦ ✦ ✦

The Discussions and the Mordica Memorial Lecture Will Be Printed in the January, 1941 Issue of Wire and Wire Products

✦ ✦ ✦

Wire Association Annual Dinner and Smoker.

American Society for Metals Dinner

✦ ✦ ✦

The Mordica Memorial Lecture.
Will Be Presented By
B. L. McCarthy, Chief Metallurgist,
Wickwire Spencer Steel
Buffalo, New York
(Topic to be announced)

✦ ✦ ✦

Wire Association Luncheon
Guest Speaker, C. M. White,
V. P. of Operations
Republic Steel Corp.,
Cleveland, Ohio
Topic: Steel Quality and Labor Relationship.

✦ ✦ ✦

PAPER: "What Does Good Laboratory Practice Do To Help Production in the Steel Industry"
By Geo. P. Lentz, Metallurgist
Union Drawn Steel, Div. Republic Steel Corp.
Massillon, Ohio

MOTION PICTURE: "Application of Tungsten Carbide Tools and Dies" Accompanied by Questions and Answers
Firth Sterling Steel Company
McKeesport, Pa.

"Electro Chemical Applications in the Wire Industry"
By Dr. C. L. Mantell,
New York, New York

MOTION PICTURE: "Copper From Mine to Market"
Phelps Dodge Copper Products Company
New York, New York
Narrator—H. A. Stout

"Uses of Lime in The Wire Industry"
By D. E. Washburn, Chief Chemist,
The Warner Company
Bellefonte, Pa.

PAPER: "Tungsten Carbide Dies and Tools"
By James R. Longwell,
Chief Engineer,
Carboloy Co., Inc.,
Detroit, Michigan

PAPER: "Recent Developments in Heating Copper Wire Bars"
By John A. Doyle, V. P.,
W. S. Rockwell Company
New York, New York

PAPER: "Continuous Annealing"
By C. F. Fantone, President
Syncro Machine Company
New York, New York

PAPER: "Fatigue Properties of Copper Wire"
By John N. Kenyon, Instructor
Civil Engineering Department
Columbia University,
New York, New York

PAPER: Title to be furnished.
By R. B. Wilcox,
General Cable Corp.,
New York, New York

PAPER: "Galvanizing Characteristics of Different Types of Steels"
By Robert W. Sandelin, Metallurgist
Atlantic Steel Company
Atlanta, Georgia

PAPER: "Design and Operation of a New Copper Wire Drawing Plant"
By H. Blount, Mfg. Engineer
Point Breeze Works, and
J. D. Wiltrakis, Engineer,
Kearny Works,
Western Electric Company

(This paper will be illustrated by both motion picture and lantern slides and describing drawing .036 copper wire at 10,000 ft. per min.)

PAPER: "Development of Apparatus For Shaving Copper Wire Commercially"
By C. E. Weaver, Dev. Engineer,
Works Laboratory,
General Electric Company
Schenectady, New York

There Will Also Be Papers on Cold Heading and Spring Making and the Exposition and Show in Association With the National Metal Congress.

MAKE YOUR PLANS NOW TO ATTEND:—

For Detailed Information on Program, Membership, Hotel Reservations and Transportation.

Address RICHARD E. BROWN, Executive Secretary,

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THE INSTITUTE OF METALS DIVISION, A.I.M.E.
THE AMERICAN WELDING SOCIETY
THE IRON AND STEEL DIVISION, A.I.M.E.

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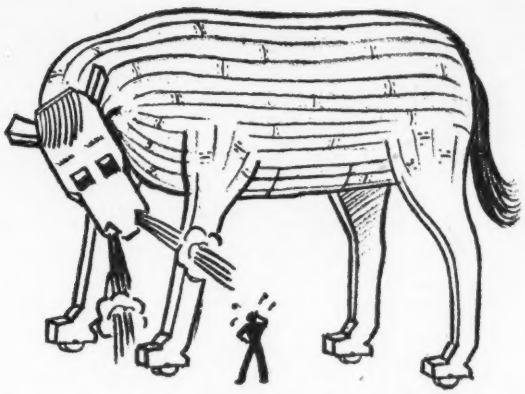
Okonite Co.
Osburn Mfg. Co.
Otis Elevator Co.

Who finds it pays?

These are some of the 845 companies that sent representatives to the national N. I. A. A. Conference last year . . . to take part in group discussions of marketing problems . . . present case studies . . . and study the advertising methods of industrial leaders.

You are invited to the 18th annual Conference of industrial sales promotion and advertising executives in Detroit next September . . . to get new ideas and information that will make your 1941 program more effective, more profitable. Write now for details.

18th Annual CONFERENCE *and Exposition*
National INDUSTRIAL ADVERTISERS *Association*
SEPT. 18, 19, 20 . . . DETROIT . . . HOTEL STATLER



Have You a "Trojan Horse"

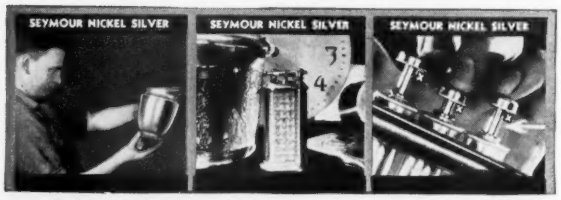
IN YOUR PRODUCT DESIGN

?

THE "Trojan Horse," symbol of the "double cross," applies to things other than war. Just as Agamemnon undermined the defense of Troy by leaving the pick of his warriors concealed in the belly of a ridiculous wooden horse, which the naive Trojans dragged inside their walls (to their downfall), so is the service-life of many a product undermined by having in its assembly some material unsuitable for the job.

Much good will (and profits) can be lost by marketing a machine or appliance that has a habit of going dead in the customer's hands. This can be caused by the corrosion of a spring, cam or slide, or by the weakening of a spring unable to stand "fatigue." Sometimes, because of lack of good ductility, a product can not be given that smart appearance which invites sales.

Seymour Nickel Silver and Phosphor Bronze have for many years been used to prevent just such drawbacks, and if you are having product trouble, it may pay you to write us for samples of these alloys for test. They will be sent without obligation.



Smooth ductility makes it ideal for spinning and drawing. Uniform quality adapts it to the making of fine etched ware. Its silvery color matches worn plating.

Resists abrasion and friction to a high degree—practically corrosion proof—takes a live spring temper which withstands hundreds of thousands of "fatigue" cycles.

SEYMOUR

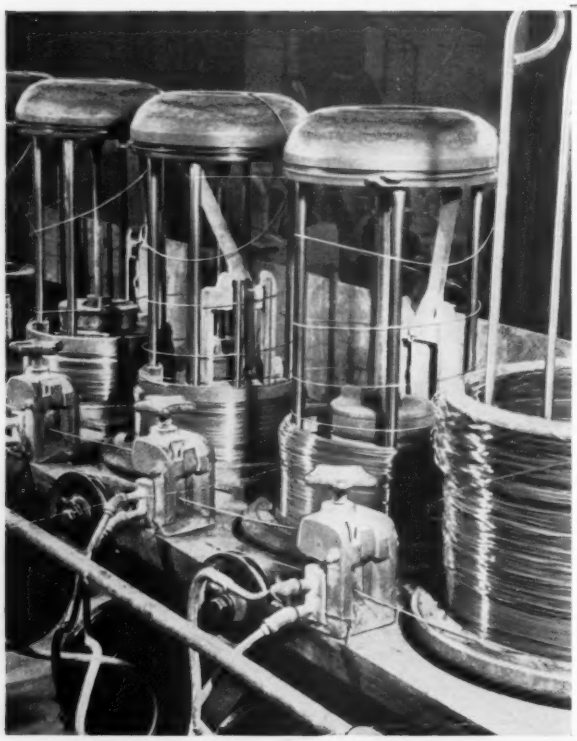
NICKEL SILVER ✦ PHOSPHOR BRONZE

SHEET - WIRE - ROD

THE SEYMOUR MANUFACTURING CO., 62 FRANKLIN ST., SEYMOUR, CONN.

WIRE ROPE

has to keep it up in Oil Field Service



BACK and forth over the sheaves—spooling on and off the drum: this intermittent service calls for special resistance to *bending fatigue.*

Good rope starts with good wire—uniform in size and quality, and drawn in a manner that develops high tensile strength and resistance to bending fatigue. Morgan Wire Drawing Machines accomplish all this at high speeds, and in addition give you extra profits resulting from better tonnage, economy of space and power, dependable safeguards, low maintenance costs.

Consult Morgan for the *latest* in wire drawing machinery.

Continuous Wire Drawing Machines; Take-up Frames; Horizontal Bull Blocks; Vertical Spindle Bull Blocks; Reels; Pointers; Wire Mill Accessories.

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS, U. S. A.
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WIRE DRAWING MACHINERY

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. 15 July, 1940 No. 7

Designated as

Official Publication By The Wire Association

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The author claims that the use of lead as a lubricant in wire drawing allows the elimination of annealing and pickling, reduces die wear, increases drawing speeds and at the same time produces improved wire surfaces and lower processing costs.

The Belgian Wire Industry ..... By L. J. C. Lepage 358

Theory and Practice of Modern Taping and Stranding, Part III ..... By Otto F. Jagielski 362

This is a final paper in a series of three discussions of the major design features that are necessary in the manufacture of a better product.

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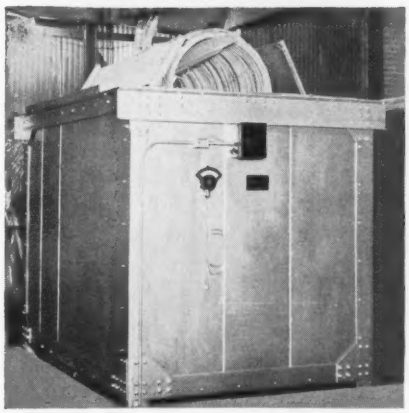

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DRAWING --- ROLLING --- EXTRUDING --- FORMING --- FABRICATING

Vol. 15 JULY, 1940 No. 7

Lead As A Lubricant In Wire Drawing

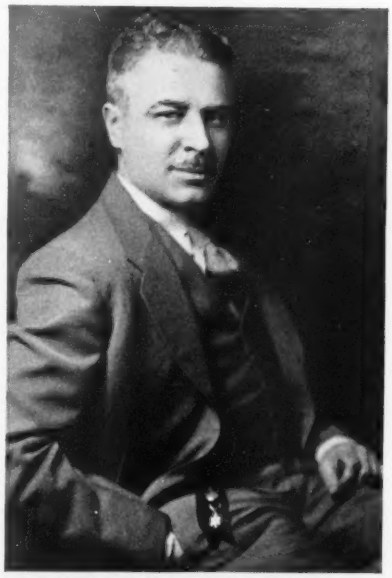
By C. L. Mantell, Ph.D.
Consulting Chemical Engineer and Metallurgist
136 Liberty Street, New York

The author claims that the use of lead as a lubricant in wire drawing allows the elimination of annealing and pickling, reduces die wear, increases drawing speeds and at the same time produces improved wire surfaces and lower processing costs. ✦ ✦ ✦

WHENEVER wire drawing is studied or discussed, emphasis is placed on the importance of efficient lubrication. The work done in drawing a wire through a die is materially affected by the type of lubricant employed. Inefficient lubrication may easily lead to seizing and tearing. From this point of view, the alloy steels and certain nickel-containing nonferrous alloys are special offenders.

✦ ✦ ✦

EXPERIENCE has shown that cold working of the "stainless" steels and irons, whether of the hardenable chromium type or the austenitic nickel-chromium variety, as well as the high nickel-chromium or nickel-chromium-iron alloys, offers much greater difficulty than do similar operations with ordinary carbon steels. Commonly on the alloys mentioned, finishes superior to those required for steel are often demanded. Seizing and tearing are liable to occur even under what would usually be thought of as excellent lubrication. These difficulties increase as the wire becomes harder due to drawing, so that frequent annealing is necessary. Often the wire has been annealed every two or three holes or draws. Such a practice is not only inconvenient from the viewpoint of expense, but introduces descaling and pickling operations which represent metal losses. Descaling and pickling may cause pitting of the wire surface.



CHARLES L. MANTELL

Ph.D. is a member of the American Institute of Mining and Metallurgical Engineers, American Institute of Chemical Engineers, American Society for Testing Materials, American Society for Metals, The Electrochemical Society and the American Chemical Society. He was educated at McGill and Columbia Universities. After army service, he was connected with the Aluminum Company of America. Since 1924 he has been a consulting engineer and has been responsible for the design of metallurgical and electrochemical plants in many portions of the world. He is the author of over a hundred technical publications and volumes.

✦ ✦ ✦

RATHER wide-spread use of the lead coating process has shown that, under proper methods of operation, lead is the best lubricant for wire drawing. For the past fifteen years, the author has been associated with the development of plant practices described in this article.

✦ ✦ ✦

The Process

IN general, the process involves removal of grease and dirt from the annealed rod or wire, pickling and scale removal, followed by washing, immersion in flux, drying if necessary, and then lead coating by immersion in a bath of molten lead. With some alloys,

particularly the chromium-molybdenum variety, adherence of the lead is facilitated by the use of an amalgamating agent: the wire or rod is dipped in a 2 per cent solution of mercuric chloride, allowed to dry, and then lead coated. Numerous plant tests have shown that no industrial hazard exists at this point. In most plants, practice can be readily brought to the point where amalgamation is unnecessary.

✦ ✦ ✦

WHEN an adherent lead coating has been applied to the rod or wire, the article may be drawn to an extent utterly impossible with an uncoated rod or wire of the same material, irrespective of die lubricants which may be employed. The lead acts as a solid lubricant of high viscosity. This lubricant rubs off only very slightly from the worked surface, despite the very high pressure set up between the wire and the die. The presence of the lead lessens the effect of the cold work on the wire. The coating of lead remains intact after a number of successive drawing operations.

✦ ✦ ✦

THIS article will concern itself with the details of the lead coating process and its application in the wire drawing industry. A comparison of typical practices may be of interest at this point.

✦ ✦ ✦

AT a large Sheffield, England plant previous practice on Staybrite type alloy, of 18 chromium, 8-9 nickel, balance iron, was as follows. Annealed, cleaned, and pickled rod of No. 5 British Standard Wire Gauge, .212 inch in diameter, was drawn to 7 gauge, .176 inch, annealed, cleaned and pickled, and then drawn to 10 gauge or .128 inch, then re-annealed, cleaned, and pickled, and drawn to 13 gauge, .092 inch. The practice involved an initial anneal and pickle, two intermediate anneals and pickles, and a final anneal and pickle. This practice was replaced by lead coating with the following results: initial anneal, pickle and lead coating of 5 gauge rod, .212 inch, drawn to approximately 12.5 gauge (.102 inch), deleaded, annealed and pickled. Further work in the plant improved the practice so that an initial anneal, pickling and lead coating of .212 or 5 gauge rod was followed by drawing to 13 gauge rod, .092, and the two intermediate anneals, cleaning, and pickling completely eliminated. The final rod showed the following characteristics: maximum strength or tensile, 134.6 tons per square inch (330,000 lb.); elongation, 2 per cent.

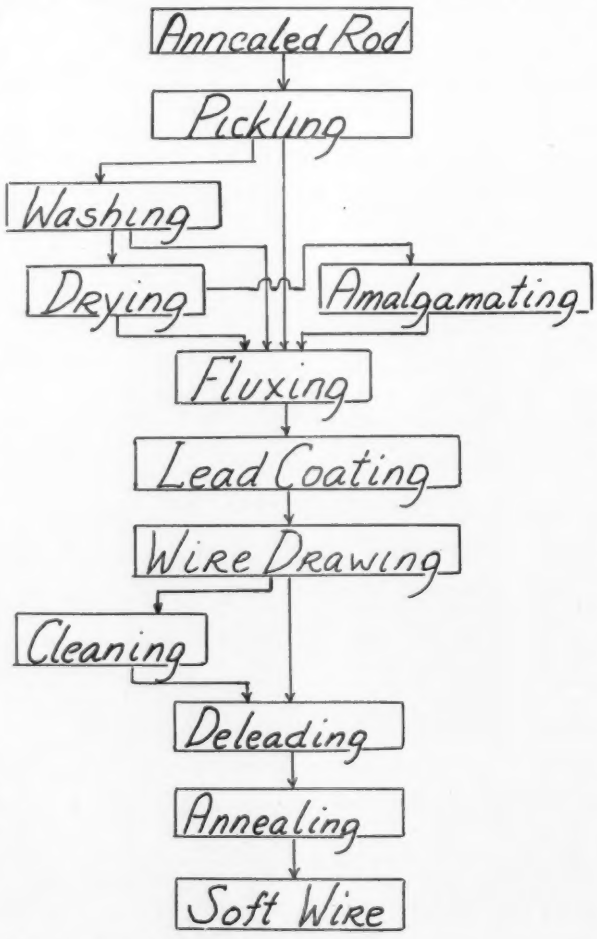


Fig. 1. Flow sheet of lead coating process.

✦ ✦ ✦

In other tests, coils of .102 inch wire of the Staybrite composition were recoated with lead and drawn down to .040 inch diameter without intermediate annealing.

✦ ✦ ✦

IN another series of tests the former standard practice as outlined above was replaced by lead coating on an austenitic steel running 16 to 20 chromium, 6 to 10 nickel, 0.2 carbon, 0.6 silicon, 0.6 manganese, balance iron, where annealed, pickled, and lead coated .212 rod was drawn to .106 inch diameter without intermediate annealing. The material had the following characteristics:

Maximum strength, tons per sq. in ..... 109.4 (245,000 lb.)
Elongation, per cent 2
Percentage reduction in area 41.9

✦ ✦ ✦

LEAD-COATED high-carbon tool steel rod was drawn from .212 to .080 without intermediate annealing, eliminating in-between operations of former practice. In the case of the austenitic steels, drawing speeds were 250 feet a minute.

✦ ✦ ✦

SIMILAR experiments on 12 to 14 per cent chromium stainless irons gave the following results: ¼-inch rod, .250, annealed and lead coated, was drawn to .080 in six passes at 100 feet a minute, after which the material was deleaded, annealed, pickled, releaded, and continuously drawn down to .032 or .028.

✦ ✦ ✦

THE steps in the lead coating process are given in the flow sheet in Figure 1. The surface of the rod or wire to be lead coated must be thoroughly cleaned. If the annealing methods employed are such that scale is formed, it is obvious that for ordinary wire drawing practice the scale must be com-

pletely removed by adequate pickling. Often in wire drawing plants wire may be surface roughened during pickling to provide anchoring or gripping surface for the lubricant. In the lead coating procedure, every attempt is made to avoid roughened wire surfaces. The pickled rod is washed and neutralized and in some special cases amalgamated, although this step is commonly omitted. Preferable practice calls for dipping the rod in a flux of 50 per cent zinc chloride in the form of a concentrated solution in water, with some ammonium chloride dissolved in it. The rods or wires may then be immersed directly in the lead pot maintained at 375 to 385° C. (700 to 725° F.) where they are completely coated. The coils are then withdrawn, allowed to drain and quenched in water, from which operation they are sent on to the drawing benches.

✦ ✦ ✦

LEAD coating in coils has a definite disadvantage that the operation may cause adjacent turns in the coils to be welded together by the lead. This disadvantage is not a serious one, inasmuch as the "sticking" turns may readily be separated, but such a situation slows down the feed of rod or wire to the first die. Strand methods of lead coating are much to be preferred and have found wide application. Strand methods allow the series or continuous processing involving pickling, washing, neutralization, fluxing, and lead coating in sequence, with wipers on the rods or wires as they emerge from the lead tank, and a continuous take-up for the wire at the end of the train.

✦ ✦ ✦

The Lead Pots

IN these installations, the lead pots are quite similar in design and operation to the mechanisms employed for tinning or galvanizing wire. IN plant installations, the lead pots may vary widely in size and contain from two to more than twenty tons of lead. The pots themselves are of heavy cast iron construction set in brickwork over burners or furnace arrangements. They are commonly heated by oil or gas, although coal is also employed. Pyrometric control regulates the heating and maintains the temperature by automatic adjustment of the heating media and the burners. Commonly overhead fume or draft hoods with blowers are provided. A typical lead coating pot installation is shown in Fig. 2 where the application is to alloy tubes whose cold working is quite a difficult operation by ordinary procedures.

✦ ✦ ✦

THE lead pot is divided into two parts by a steel partition which dips well below the surface of the lead. On one side of the partition, at the end of the pot at which the wire enters, the surface of the molten lead is covered with a suitable flux through which the wire or rod passes. Having been fluxed and coated, the wire passes under the partition to the other side where the surface of the molten lead is kept free from flux. The partition effectively prevents patches of flux from adhering to the coated article. The shape of the lead pot will depend upon the type of article to be treated. For rod or wire, a long narrow trough divided transversely into two unequal compartments is suitable. Tubes call for a somewhat different arrangement. The lead bath must be long enough to accommodate the longest tube and be perhaps 4 or 5 feet wide. The partition in this case is longitudinal. The tubes are mechanically fed to the bath, fluxed, and then forced under the partition.

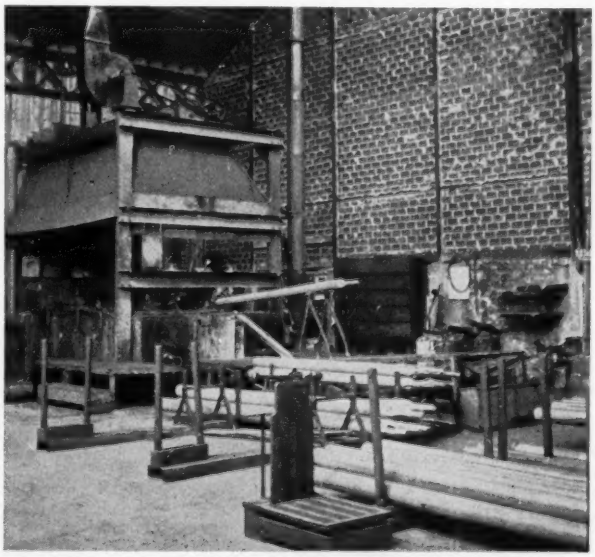


Fig. 2. Lead coating of tubes for cold drawing.

✦ ✦ ✦

IN coil dipping methods there is commonly no dividing partition and the entire surface of the lead is covered with flux. The coil is passed through the flux layer to the lead, coated, and then withdrawn. Quenching and passage through the first die effectively removes all flux. In some plants a portion of the coil may be dipped and the coil rotated so that the entire surface of the rod or wire is covered.

✦ ✦ ✦

Types of Lead Used

THE lead employed is relatively pure, being clean, desilverized, and low in arsenic and antimony. Common lead of the Grade 3 Specification of the A.S.T.M. B29-35 showing:

Silver	**0.002%**	**max.**
Copper	**0.0025**	
Arsenic, antimony and tin together	**0.015**	**max.**
Bismuth	**0.15**	**max.**
Iron	**0.002**	**max.**
Zinc	**0.002**	**max.**
Lead by difference	**99.85**	

may be used. In other plants, however, leads containing 99.75 per cent and bismuth up to 0.25 have been found to be satisfactory. In still others, secondary leads with an appreciable tin content have been used with success. Tin-containing leads with two or more per cent tin have been proposed and employed as drawing lubricants. The tin components, however, are much more expensive than the lead and in practice have

not been found to be necessary, inasmuch as with good cleaning practice excellent adherence of the lead may be obtained without the "wetting action" of the tin.

✦ ✦ ✦

Removal of the Lead

THE removal of the lead from the finished drawn article or the wire at an intermediate stage of drawing is a simple operation. In the case of corrosion-resistant materials like the nickel-chrome stainless steels, the nickel-chrome alloys, or the chromium steels, deleading is accomplished by a pickling operation in 20 per cent nitric acid. If in the handling of the wire considerable dirt and grease has been picked up on the coils, a preliminary degreasing or cleaning in an alkaline cleaner is advisable in advance of deleading. For some applications the lead may be left on to serve as a lubricant in further fabrication of the rod or wire. Commonly, however, deleading is performed in advance of annealing. It is obvious that if the wire is to be furnished in the hard condition, the lead coating on ferrous wires will serve as a protection against corrosion.

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Annealing Lead Coated Wire

LEAD coated wire may, however, be annealed by close annealing methods or in reducing gas atmospheres. Some of the lead, of course, melts off and will finally collect at low points in the furnaces. Properly deleaded wire carries no lead metal into the annealing operations. In the case of iron and steel materials, it is possible to selectively dissolve off the lead, without appreciable effect on the steel, by the use of saturated common salt solutions in water made acid with 0.5 to 10 per cent sulphuric acid and operated as a pickle. In the presence of small amounts of nickel salts, lead dissolves in acidulated sodium chloride solutions. Lead chloride, which forms when an attempt is made to dissolve lead in hydrochloric acid, ordinarily forms a protective insoluble coat in that the lead chloride is not soluble in water. Lead chloride, however, is soluble in saturated salt solutions and in these lead will evolve hydrogen when brought in contact with an acid. Other deleading solutions may be used, an example of which is 5 per cent sodium acid sulphate, 2 to 5 per cent sodium acetate, 2 to 5 per cent sodium nitrate plus the addition of 1 to 10 per cent sulphuric acid.

✦ ✦ ✦

FROM all these lead removal baths, lead salts are finally collected, usually as crystallized lead chloride. These salts are either sold as such for their lead content to the chemical trade, or else are dried, smelted, and the lead recovered and credited to the process. With effective lead salt recovery, lead losses in the plant are low.

✦ ✦ ✦

To Completely Delead

IT is not difficult to completely delead. The lead removal job is perhaps most difficult in the case of tubes where the lead lubricant is on the inside and outside of the tubes. Plant tests have shown that if a foot section were taken from the center of a 20-foot tube, ½ inch in diameter, which tube had been lead coated, drawn, and deleaded, and this foot section were completely treated in the laboratory to dissolve it entirely, tests for lead, sensitive to one part in 400,000, fail to show its presence after the deleading operation. It is obvious that deleading of wire and rod is a much simpler operation even from the pure mechanical viewpoint than the internal deleading of small-diameter long-length tubing.

✦ ✦ ✦

DELEADING methods following pickling procedures may be readily adapted to strand or continuous processing. There has been some consideration given to electrolytic deleading in solutions of alkalies where the wire or rod is made the anode in the circuit. Given sufficiently high current densities on the wire, cleaning and deleading may be accomplished at speeds of several hundred feet a minute.

(*Please turn to Page 371*)

Fig. 3. Single holing of lead-covered rod. ✦ ✦ ✦ ✦

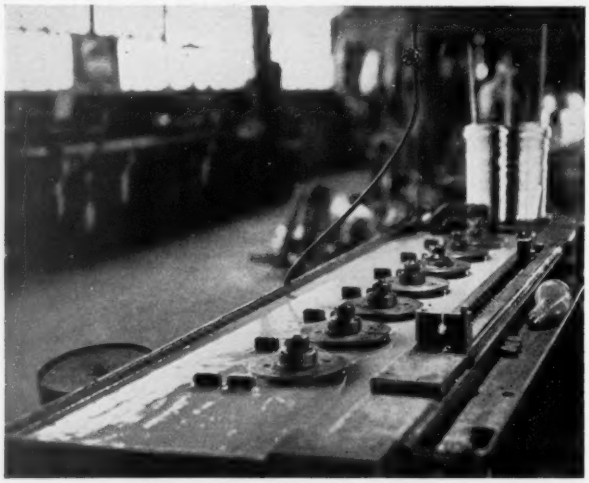

Fig. 4. Continuous drawing of lead-covered wire. ✦ ✦

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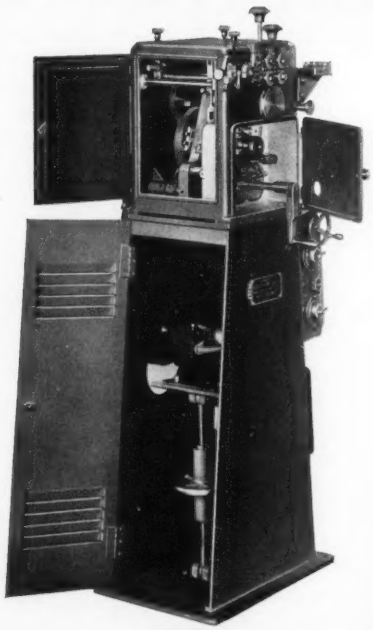

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The Belgian Wire Industry

By L. J. C. Lepage
Managing Director, Sambre-Escaut, S.A.,
Hemixem, Belgium
(Translated by Kenneth B. Lewis)

This article was written by Mr. Lepage prior to the German occupation of Belgium and is in a large part a description of their export plant. It is quite probable that this mill is now in German hands. ✦ ✦ ✦

THE nail industry of Belgium had its origin more than seven hundred years before the birth of Christ. In those far distant days huge spikes, forged from native iron, were used to secure heavy timbers; many specimens may be seen, notably in the archaeological museums of Charleroi and Namur, among Belgo-Roman relics of the region between the Sambre and the Meuse. Nail making first sprang up in the Liege and Charleroi neighborhoods, close to iron ores and fuel (at that time charcoal) but especially near Fontaine l'Eveque, a region which, because of a contest of ownership between the Counts of Hainaut and the Princes of Liege, offered nail makers a chance to evade certain excises.

✦ ✦ ✦

WIRE drawing in Belgium was of a much later origin. It began as a hand operation, with the usual passage through dies, and progressed through the normal steps of mechanization by the use first of wooden, then of cast iron, and finally of steel machinery. The making of screws was not introduced until the last half of the nineteenth century.

✦ ✦ ✦

The Technique

THE raw material is wire rod ranging in size from .200″ to ½″ diameter. It is prepared by pickling off the scale and then neutralizing the acid with lime or with tri-sodium phosphate. As an indication of progress it may be said here that this operation which once consumed many hours is now completed in 6 to 7 minutes. Sulphate recovery plants are installed near the cleaning houses with the dual purpose of regenerating the waste liquors, and of preparing ferrous sulphate for the market. After pickling and liming the wire passes through driers, after which it is ready for reduction.

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REDUCTION is effected by passage through one or more dies of conical section. The material used for dies for round wire is tungsten carbide, and each plant includes a shop devoted to the sizing and polishing of these dies. Shapes other than round are usually drawn in dies of hard steel. Because of a great increase in drawing speed in recent years not only the dies but also the blocks are arranged for artificial cooling by water under pressure.

Fig. 1. Part of store houses for barbed wire and galvanized wire. ✦ ✦ ✦

ORIGINALLY each draft was independently performed upon a single block, but modern practice favors the use of continuous machines (as of the Morgan type illustrated) carrying 2 to 11 drums, by which, without intermediate handling, a number five rod can be reduced to as small as .025″. To produce wires from .025 to .015 one may start with a wire of .090″ and give it from 7 to 11 drafts. Very small wires are drawn on machines whose finishing drums travel at a peripheral speed of the order of 2000 f.p.m. A wire, for example, of .004″ would be reduced from .080″ after pickling and giving it a light copper coat.

✦ ✦ ✦

OF the bright drawn wire so obtained, a pat is shipped to consumers or to fabricators, but many mills pass it along to their own fabricating departments for the production of annealed, galvanized, tinned or painted wire, nails, brads, rivets, wood and machine screws, bolts, barb wire, bed springs, helicals, diamond or hexagon mesh fabrics, etc. The production of such a great variety of items under the best technical methods and at satisfactory costs calls for a complete organization and a large output, which explains the large capital investment in the wire industry. This will be clear from the following review of the processes.

Annealed Wire

ANNEALING is done in closed pots which stand for some hours in high temperature furnaces. Sometimes instead of the usual blue annealed wire the job calls for a bright anneal, which is accomplished by maintaining a neutral atmosphere in the pot to avoid oxidation. Wire of a breaking strength of 900 to 1400 lbs. is softened by annealing to a strength of 500 to 600 lbs.

✦ ✦ ✦

Painted Wire

THREE of the Belgian mills specialize in painted or varnished wire for export to South America and South Africa. This wire is first annealed, and then coated by automatic or semi-automatic means.

✦ ✦ ✦

Galvanized Wire

GALVANIZED wire has made great progress, in physical as well as non-corrosive properties. Wire ranging from .250″ to .050″ is commonly treated continuously in units running from 40 to 52 strands. The bright wire first passes through muffle annealing furnaces, 40 to 70 feet long. It is then cleaned in muriatic acid, rinsed, fluxed in zinc chloride or a double chloride of zinc and ammonia, and dried. After passage through molten zinc it is wiped, rinsed, and again coiled. Units generally measure some 350 feet in length, and turn out 60 to 75 tons per day per furnace.

✦ ✦ ✦

Nails

WIRE nails have been made mechanically for many decades, but the speed, formerly very low, has gradually risen to the vicinity of 700 per minute. The wire is gripped in the machine while the hammer strikes up the head, then the wire is advanced a short distance, dependent on the desired nail length, and the cutting dies shear a point. Each revolution of the flywheel completes this cycle and produces one nail. Before packaging, the nails are polished in tumbling barrels. They may be shipped bright, cement coated, blued, tinned, galvanized, or brass plated.

✦ ✦ ✦

THE Belgian mills are thoroughly equipped with the latest machinery for all varieties of nails, round or square shank, triangular, twisted, etc. They supply "panel pins" to the Indian specifications, "shoe rivets" to British requirements, numerous specialties required by Dutch shoemakers, roofing nails with extra large heads, orange-box nails, etc., etc.

✦ ✦ ✦

Brads

UNDER this term we include all the nails with small heads and small shanks used by shoemakers, upholsterers, and others. The heads vary considerably in shape and size, as do also the points. The making of small brads for machine driving is a specialty particularly well covered in the Belgian mills, both round and square shank. It is interesting to note that a package of 1 Kg. holds 30,600 nails of this type.

✦ ✦ ✦

Hob Nails

HOB-NAILS involve a drastic working of metal, because of the great difference between the shank and head sizes, and call for a very malleable wire. A wire of .240, for instance, is reduced by compression, as shown in the sketch, to the desired shank size, after which the head and point are formed and the nails tumbled in the usual manner.

✦ ✦ ✦

Rivets

COLD headed rivets range from .040″ to .625″ and are made on either open or closed die machines whose production has mounted steadily during the past twenty years. Those for use with thin sections, as well as blanks for wood screws, are made on single-blow machines, and those used for heavy or medium plates, blanks for machine screws, and small bolts, are the product of double blow machines.

✦ ✦ ✦

STEEL wire cannot be headed in a single blow machine unless the length of the shank is at least two and one half times its diameter. A double blow machine is necessary also if the diameter of the head is to be four or five times that of the shank. The first blow does most of the deforming, and the second determines the exact shape. If the diameters are to have an 8 to 1 ratio a special press is required.

✦ ✦ ✦

Wood Screws

ALTHOUGH the raw material is the same, the process of making wood screws differs entirely from that for nails. The blanks are struck up on automatic headers, the heads are slotted as a separate operation, and the threading and pointing are done on a specialized screw-thread machine. The metal may be steel, brass, or aluminum, or the screws may be finished by

Fig. 2. Re-coiling and polishing equipment.

✦ ✦ ✦ ✦ ✦

chrome or nickel plating, tinning, galvanizing, or brass plating.

✦ ✦ ✦

A FEW rough figures may be interesting. The four Belgian producers total about 9 million gross, about 3,600 tons, of which 60% is exported. This 3600 tons of screws required 4800 tons of rod. The value of the 6½ million gross exported is in the vicinity of $600,000.

✦ ✦ ✦

Machine Screws and Small Bolts

AS already stated, blanks for cold headed bolts and for machine screws are made on double blow machines in closed dies. The threads may be cut or rolled. Thread rolling for machine screws was adopted in the United States toward the close of the last century, it is commonly used in sizes up to 1¼" in machine screws, and in lag screws of ⅝" and coarser.

✦ ✦ ✦

RESEARCH in various institutions has established the superiority of the rolled over the cut thread, due to the fact that rolling does not interrupt the longitudinal fibres. The speed of thread rolling is of the order of 35 to 175 units per minute.

✦ ✦ ✦

Barb Wire

BELGIUM specializes in barb fence for export, some companies having handled single orders exceeding 2000 tons for over-seas. Our mills turn out all the current types, such as Glidden, Iowa, Waukegan, Domingo, Lyman, square line, war wire, American perfect, American special, Star Monessen, etc., and deliver on any specified type and size of bobbin.

✦ ✦ ✦

Spring Beds

SPRING beds require a number of special wire items, such as helicals, chains, links, hooks, rings and the like. The helicals are turned out in continuous lengths and cut automatically to required lengths, the end hooks being turned up automatically. The chains also are automatic machine products, and the various pieces of linkage are turned out on 4-slide machines. The Belgian mills cover a great range of designs of spring fabrics, and can fill orders on short notice; the same is true of furniture springs, which are produced in coppered wire, or galvanized, or lacquered.

✦ ✦ ✦

Netting and Woven Fabrics

OUR mills turn out every type of fence, netting, and wire fabric. Among others we will mention diamond mesh, hexagon mesh, chain link, and ring lock fencing, and welded mesh for road and concrete work. The diamond mesh is made on completely automatic machines when standard types are in question, and on semi-automatic machines for special types.

✦ ✦ ✦

WHILE our mills turn out every variety of netting, it is hexagon mesh which constitutes the particular specialty of the Belgian producer. Three plants are engaged in this work, and sell mesh galvanized before, and galvanized after weaving. The machines are very ingeniously designed, and are built with the utmost degree of refinement.

✦ ✦ ✦

THE production of these meshes calls for various accessory machines, such as those for winding bobbins and for filling tubes, and for galvanizing the woven fabric. The latter operation is relatively simple; the fabric is pickled, rinsed, dipped in flux, and drawn through molten zinc.

✦ ✦ ✦

S. & C. Bale Ties

AMONG our specialties are straightened and cut wire and bale ties, which may be bright, annealed, or galvanized. The straightened and cut wire finds a large market among welders, and the bale ties are used for baling up straw, rubber, wood pulp, etc.

✦ ✦ ✦

Packaging

PACKAGING is of considerable importance in the export trade. Wire mills of any size maintain large stocks of lumber, and woodworking shops of considerable size for turning out the various types of box, barrel staves, bobbins for barb wire, and other essentials. Here are a few remarks which will go to show the intricacy of the problem.

✦ ✦ ✦

BARB wire is spooled, during its fabrication on either wire or wooden bobbins, in weights dependent on the market in view. While some types of spool will serve in many markets, other markets require very definite sizes and designs. Colombo, for example, wants a spool with a wooden barrel and sheet steel ends painted half red and half blue. These spools carry 28 lb. of wire, and are linked in pairs. This market occasionally takes all wood spools, 28 or 56 lb. net.

✦ ✦ ✦

DIMENSIONS of the spools are frequently specified. Manila, for example, wants wooden spools, the barrel formed of four prismatic pieces, and a net weight of 40, 80, or 112 lbs. Other markets, such as

Fig. 3. Part of store house for wire.

✦ ✦ ✦ ✦ ✦ ✦

England and Ireland, specify the length of the wire as well as the weight: 220 yards, 40 lbs. for 6″ spacing of barbs. The spools are of wood, armored with galvanized wire.

✦ ✦ ✦

Fig. 4. Packing wire for export.

AS for nails, some markets require shipment in containers of specified dimensions. The nails are usually in pasteboard cartons of various weights, one pound for British India or Curacao, 2 kilos for Palestine or Bolivia, 5 catties for Dutch East Indies, etc. Other countries want shipment in kegs, either painted or plain, with height, diameter, and weight specified. China and the Straits Settlements call for 1 picul per keg; Philippines, Siam, Jamaica, United States, and Cuba, 100 pounds per keg, Costa Rica 45 kilos per keg, and so on. Some British importers call for bags, 1 cwt., or ½ cwt.

✦ ✦ ✦

WIRE, on the other hand, usually goes without packaging except for fine sizes, coppered finish, or other special wires. Nevertheless, special conditions and customs call for special treatment for certain products. Bright wire going to Iraq must be burlapped, as must also annealed wire for the Dutch East Indies; small sizes go to Portugal papered and burlapped, coppered wires for the Low Countries are wrapped with crepe paper; East Africa wants bright wire wrapped in oiled paper and packed in barrels.

✦ ✦ ✦

Quality of Belgian Wire Products

CAREFUL study of market requirements over a long period has enabled the Belgian industry to keep its product constantly improving. Each mill has its research laboratories, constantly striving for a higher degree of perfection and of control. Belgian producers offer their wares without hesitation to the inspection of Hunt, Hatt, Palmer, Controle Technique, Bureau Veritas, and others. We strive not only to keep abreast of technical progress, but to anticipate it, in which efforts we are ably seconded by our producers of raw material. We are constantly searching for new markets and for new products, and always welcome suggestions.

✦ ✦ ✦

Capacity

THE Belgian mills in 1926 and 1927 averaged 300,000 tons, 80% of which was exported. The average from 1928 to 1930 was 271,000 tons, of which 218,000 was exported. The figures in Table A bring the record up to 1937.

✦ ✦ ✦

THERE was a considerable drop after 1930, due to the serious world crisis in trade and to restrictions imposed by various countries. The large excess of mill capacity during these years has facilitated excellent deliveries. This, added to our low cost of production due to excellent facilities, and long experience in foreign markets, has allowed us to keep up to a reasonable level of operations, such a level as we require in order to keep our costs down.

✦ ✦ ✦

THE nominal capital of the Belgian wire industry is about 220 million francs, but their actual value, with due regard to profits reinvest-

(*Please turn to Page 378*)

TABLE A

year	tons	value in millions of francs	tons exported	value
1932	138,000	230	103,000	150
1933	144,000	224	107,000	144
1934	135,000	185	100,000	117
1935	171,000	264	130,000	184
1936	168,000	282	125,000	193
1937	177,000	370	135,000	267

Fig. 5. Modern barbed wire mill.

Theory and Practice of Modern Taping and Stranding

By Otto F. Jagielski,
Consulting Engineer,
Lynn, Massachusetts

PART III — Taping (Continued from April, 1940).

This paper is presented to those interested in Wire Mill machinery as a discussion of the major design features that are necessary in the manufacture of a better product.

Taping (Continued)

THE following is a continuation of the desirable features which a modern taping machine should embody.

✦ ✦ ✦

Feature E

An automatic stop, so that when the tape breaks or a pad runs out, the machine will stop quickly.

✦ ✦ ✦

AN automatic stop adds much to the efficiency of a taping machine, whether there be one pad or many.

✦ ✦ ✦

DUE to the high speeds of modern taping it is impossible for the operator to observe pad run-out, unless the machine is stopped frequently.

✦ ✦ ✦

TAPE breakage was discounted earlier in this paper as overcome on a modern taping machine, assuming that the tape is of good quality and able to resist the adjusted tension throughout its length. As tape of good physical properties is not always used there should be two automatic stop mechanisms provided for each tape, one to operate at the part of the tape where the tension is greatest, and the other on the pad to operate at the point of run-out. Increased efficiency will quickly effect the extra cost of these mechanisms.

✦ ✦ ✦

THERE are two types of automatic stops in common use—i.e.—electrical and mechanical.

THE electric stop is the more simple and safe type for machines with many tapes and may be arranged to break the circuit of the driving motor which is equipped with a salinoid brake for quick stopping.

✦ ✦ ✦

THE mechanical stops are used mostly on machines with one tape and when the tape used is strong and breakage unlikely. Usually they are arranged to stop the driving motor or operate a signal to attract the operator's attention.

✦ ✦ ✦

Feature F

A uniform advance of cable through the machine. Any backlash or possible slipping must be eliminated.

✦ ✦ ✦

UNEVEN advance of the cable through the machine, backlash, and slippage of the cable on the capstan is usually due to poor design or poor workmanship.

✦ ✦ ✦

BEFORE going further in the discussion of Feature "F" I would like to mention a question which has been raised from time to time. This question relates to the advisability of using a variable speed transmission on the taping head or capstan drive, or on both.

MY experience has shown that this depends entirely on the type and the purpose of the machine and my recommendations are usually in the following direction:

✦ ✦ ✦

ON a **paper taping machine** with many tapes, the taping heads should operate at a constant speed and the capstan drive should be arranged for variable cable advance to obtain desired lay setting.

✦ ✦ ✦

ON **varnished cambric taping machines** it is desirable to have both the taping heads and the capstan arranged with variable speed transmissions, also, means should be provided for disengaging the variable speed transmissions on the heads and engaging with a positive drive with all heads rotating at same and constant speed.

✦ ✦ ✦

SINGLE **taping head units** whether of the concentric or eccentric type, working in conjunction with other machines such as closers, stranders, or rubber tubing machines should be equipped with variable speed transmissions.

✦ ✦ ✦

ON **single taping head machines** of the concentric or eccentric type operating as individual machines the capstan only should be driven through a variable speed transmission. However, it is desirable to arrange the main drive so that the speed of the taping head and the capstan may be controlled as a unit; the speed depending on the width of the tape.

ON **magnet wire machines** in which tape is also applied, it is desirable to have variable speed units on the taping heads, cotton covering heads, and the capstan. This is done to take advantage of the maximum permissable speed of the cotton covering head.

✦ ✦ ✦

AS to brake application on the two different head drives, namely, head drive through variable speed transmission and head drive direct, it is desirable to apply the brake on the head shaft if driven through a variable speed transmission or if driven direct the brake should be applied on the motor or main line shaft.

✦ ✦ ✦

NOW, in going back to feature "F", an uneven advance of cable through the machine can often be caused by a not powerful enough variable speed transmission unit and slack of cable on the capstan. The latter can be eliminated by making as many wraps of cable around the capstan as possible with sufficient tension in the cable between the capstan and the cable take-up. The cable take-up, therefore, must be designed accordingly; when the machine proper is stopped, the tension in the cable between the capstan and the take-up should not slacken. There should be a continuous pull on the outgoing cable from the capstan.

✦ ✦ ✦

THERE will, of course, always be a certain amount of backlash in the taping head and the capstan, however, this may be reduced to a minimum by proper design.

✦ ✦ ✦

TOO many gears in a train for one drive will give more backlash than a roller chain drive equipped with a chain tightener. Where speed reduction is necessary, worm gear type reducers are most effective in reducing backlash to a minimum.

✦ ✦ ✦

Feature G

A taping machine with many tapes built as short as possible and still allowing sufficient space for the operator to handle and watch the tapes.

EVERY taping machine with many tapes equipped with any of the heads illustrated in Figure 4 to 8 included, Part II, can be built with convenient accessibility to the tapes, but not each of the five tapes can be used if a short machine is required.

✦ ✦ ✦

AS stated before, the taping head shown in Figure 4, Part II is best suited for a short machine. For example, a taping head section with 72-22″ diameter by 1¼″ wide pads, built as per Figure 4, Part II, would have a length of 13 feet between bearing strands, allowing a space of 8″ between tape pads for handling and making adjustment. This example applies to a modern machine with the most accurate tension devices and requiring no parts to be removed when placing and replacing pads.

✦ ✦ ✦

IF, now, the head shown in Figure 6, Part II were used for a 72 tape section, consisting of 8-22″ diameter pads per head, each head would require a space of 32″, allowing 10″ for handling the tapes and making adjustments. The 9 heads required for a 72 tape section would bring the total length between bearings to 25′-4″.

✦ ✦ ✦

IN the above cases, the taping head section with 72 tapes can apply the tapes in one direction only. A machine with 72 tapes and more than one section will increase the overall length of the machine proper accordingly.

✦ ✦ ✦

Feature H

The elimination of cable twist caused by pull of the tape and poor guide of the cable over the capstan.

✦ ✦ ✦

IT is difficult to keep a cable from twisting due to the pull of tapes on a machine with many tapes built in one section and less difficult on a machine with short sections containing a small number of tapes. The shape of the cable is also a considerable factor in keeping same from turning by the pull of tape. The shape of cables can be classified:

1. A round cable
2. A sector shape cable
3. A sector shape, pre-twisted cable.

✦ ✦ ✦

IF any of the above three types are to be taped on a machine with short head type sections, each head containing, say, 8 tapes, the head sections should be made to rotate in alternate directions, so that, one group of tapes will pull in one direction and the next group in the opposite direction.

✦ ✦ ✦

WHEN using this arrangement, stationary round wooden dies placed in front of head section close to point of application are sufficient.

✦ ✦ ✦

HOWEVER, if all or a larger group of tapes are going in one direction, stationary round dies are insufficient to hold the cable from turning.

✦ ✦ ✦

THE following arrangements are desirable:

1. **For round cable:** A 3-roller clamp device mounted stationary between groups of 8 to 12 tapes.
2. **For sector shape cable:** A 2-roller device, the roller grooved that when together, form a circular sector to fit the cable, mounted stationary between groups of 8 to 12 tapes.
3. **For sector shape, pre-twisted cable:** Same as class 2 but must be driven and so arranged that the 2-roller device rotates with the pre-twist in sector cable.

✦ ✦ ✦

BESIDES the roller supports, narrow bushings should be placed as many as space permits in order to keep the cable in center of machine. Weaving of cable due to pull of tape also causes a frequent change of tape angle and consequently an uneven tape lay.

✦ ✦ ✦

TWISTING of cable is also often caused by the travel of cable over the capstan if not properly guided from one side to the other. If the surface of cable is smooth, an ordinary polished fleeting knife often is sufficient. A roller fleetor, so arranged that the point of contact between the roller and

(*Please turn to Page 375*)

Relative Patenting Speeds

By Kenneth B. Lewis,
Consulting Engineer,
Worcester, Mass.

BONZEL says, with relation to changes in speed of patenting with changes in section: "As a furnace should be designed to carry to the desired temperature a given number of pounds of steel in a given time, the speed of travel ought theoretically to be inversely proportional to the square of the wire diameter so that the output of the furnace would be quite independent of the size of the wire. It is impossible however to adopt this as a law, for it would work a hardship on the smaller wires. While it is true that the amount of heat to be transmitted varies as the square of the diameter, it must be recalled also that the surface through which it must be transmitted varies only with the first power of the diameter. While it is impractical to work to the squares of the diameters it is also uneconomical to work to the diametral ratio itself; a compromise is effected."

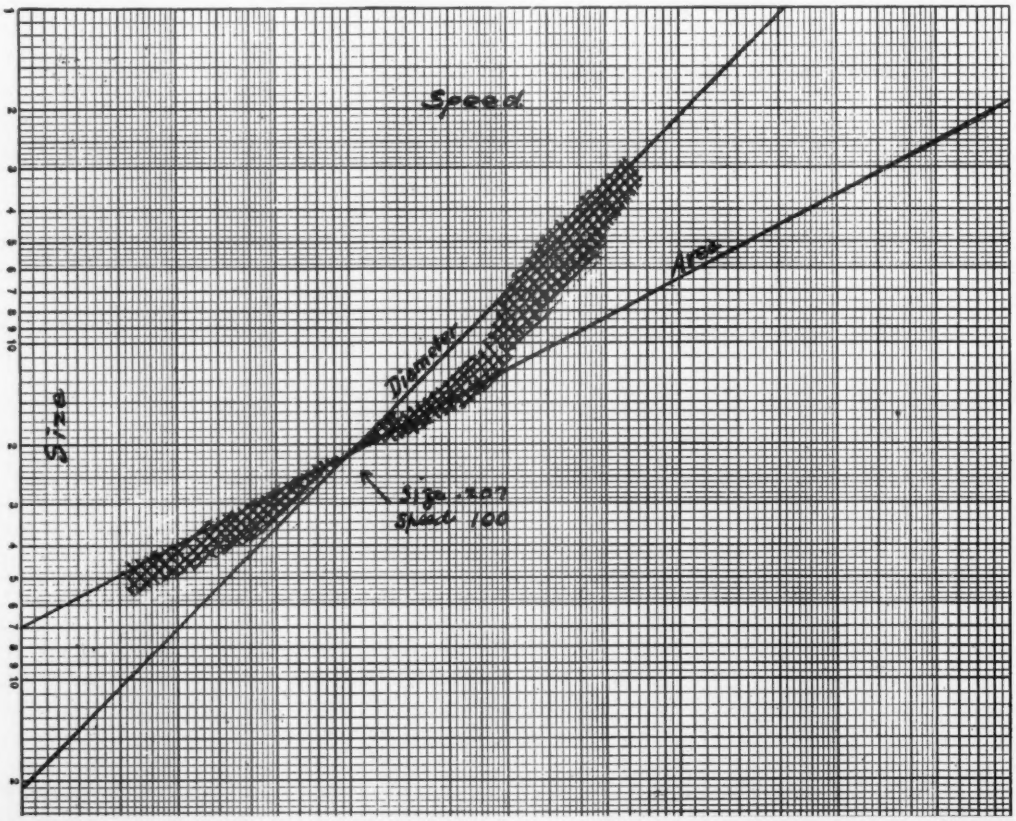
✦ ✦ ✦

THE writer, being curious as to just how the compromise is effected, has secured data from six representative installations handling a broad range of patented sizes, and presents the data in the form of the accompanying chart. Since a tremendous percentage of patenting is done on number five rod, and most furnaces are designed expressly for that size, all schedules have been calculated to a base speed of 100 units for number five, and figures have also been corrected, where necessary, to a constant furnace length.

✦ ✦ ✦

ONE of the diagonal base lines represents the speeds as they would vary with the area of the cross-section, and the other shows speeds varying with diameter. It will be noted that as the curves rise into the smaller gauges, practice favors a speed increase which at first tends to follow the area curve but which quickly shifts and clings to the diameter line. This is doubtless due partly to the difficulty of transmitting heat rapidly through

(*Please turn to Page 375*)



Wire Association Emergency Advisory Committee

WHEN the matter of industrial mobilization began to demand public attention, the Secretary of the Wire Association addressed a letter to the several directors, outlining a suggestion that the Association form an Emergency Advisory Committee for the purpose of rendering such service to the industry and to the military procurement services as might be found necessary in the event of an emergency arising. The thought was that such a committee should be organized to be ready to function if the need arose but not to become active unless it was found necessary because of conditions which might develop in the near future.

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AS a result, on June 19th, 1940, a meeting was called in Washington at the request of the majority of our board of directors. This meeting consisted of a committee designated by the President of the Association to consider what part, if any, the Wire Association should play in national defense. The committee consisted of

Mr. Ralph K. Clifford
Mr. B. L. McCarthy
Mr. Sidney Rolle
Mr. J. K. Beeson
Mr. R. E. Brown

✦ ✦ ✦

MAJOR BYRON A. FALK of the Office of the Assistant Secretary of War was present, to advise regarding the services and procedure of the committee in the event of its formation.

✦ ✦ ✦

IT was decided at this meeting to organize a small general committee with a chairman having a recognized status in the industry and that this committee be divided into three main parts; a general chairman to have complete charge of interassociation coordination and two vice-chairmen, one in charge of non-ferrous and the other in charge of ferrous activities. It was further suggested that the president or active head of each company having a membership of three or more be requested to appoint one of the now present members of the Wire Association to represent his company on this committee.

✦ ✦ ✦

IT was further suggested that a number of subcommittees be formed to cover coarse wire, fine wire, stainless steel wire, stranding of rope, etc., and that the members of such committee be made up from company representatives in the Wire Association.

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IT is thought that each of these subcommittees should have a chairman and that each subcommittee should be intrusted with the job of studying their own field as regards approximate available tonnage and passing on specifications from the manufacturing viewpoint. In addition, each of these committees should make themselves available for ready contact with the industry regarding any information they may be asked to furnish in connection with emergency production activities.

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IT was brought out in the meeting that many of the medium-sized and smaller manufacturers of wire were not familiar with Government specifications and requirements and it was felt that each subcommittee should be provided with copies of Government specifications covering their field and put themselves in a position to comment on the merits of such specifications from the production viewpoint. In this way an organization could be developed which could act quickly on any requests for information that might come to the Association from the Government agencies.

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IN general, the function of the entire committee will be to receive and disseminate information on Government wire needs, specifications, capacities and other pertinent matters relating to production, and to act as a liaison committee between the members of the Association and other agencies insofar as our members may have need for such a committee.

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THE committee is designed to serve as an advisory body on wire and wire products questions asked by the Government of the committee, or asked by an individual member of the Wire Association of the committee, but is not designed to activate any movement unless requested by a member of the Wire Association.

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AT the present time the President of the Association is contacting other associations in an effort to eliminate any duplication of activity and to coordinate our own activities with those of other

(Please turn to Page 380)

Outstanding Personalities of the Wire Industry

Henecker and Kendall Named Assistant Managers by J. & L.

THE establishment of two new Assistant Managers of Wire Products Sales with the appointment of **D. J. Henecker** for wire rope and **C. E. Kendall** for wire and galvanized sheets, was announced today by Jones & Laughlin Steel Corporation, Pittsburgh. The consolidation of its wire rope sales division into its wire products division under **J. E. Timberlake,** present manager of Wire Products Sales, was also announced.

✦ ✦ ✦

MM. HENECKER has been associated with the wire rope industry since 1922, when he was employed in the New York warehouse of American Steel & Wire Company. He advanced through various positions, his work taking him to the Southern territory and to Buffalo until 1930, when he was appointed Manager of Wire Rope Promotion Sales in New York. A year later he was made Assistant Sales Manager of the Eastern Division. In 1932, Mr. Henecker joined the sales force of Wickwire Spencer Steel Company as Assistant Manager and later became Sales Manager of the Buffalo district. In 1937 he was appointed General Manager of Wire Rope Sales for the United States, and, in addition in 1939, became Sales Manager for all products of the Eastern district, which position he held when coming to J. & L.

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MR. KENDALL has been with J. & L. in the Wire Sales Department since February, 1939, having been prior to that, Manager of Merchant Product Sales for Pittsburgh Steel Company. Practically his entire business experience has been with Pittsburgh Steel, having started with them in 1919 in their Chicago office. In 1923 he became Assistant Manager of that office, which position he held until 1928 when he was transferred to Pittsburgh as Assistant Manager of the Fence Department. He was made Manager

C. E. KENDALL
Asst. Mgr., Wire Products Sales,
Jones & Laughlin Steel Corp.

of that department in 1930. In 1935 he became Manager of the Merchant Products Sales Department at Pittsburgh, the position he held prior to coming to J. & L.

✦ ✦ ✦

Becomes Sales Manager of Wickwire Spencer

A. G. BUSSMAN has been appointed general sales manager, Wickwire Spencer Steel Co., New York. He succeeds **R. L. Foster,** vice president in charge of

D. J. HENECKER
Asst. Mgr., Wire Products Sales,
Jones & Laughlin Steel Corp.

sales, who has retired. Mr. Bussman will assume all responsibilities previously carried by Mr. Foster.

✦ ✦ ✦

ATTENDING Carnegie Institute of Technology, Mr. Bussman served as chemist for the New York public service commission and then for 14 years as chemist and welding engineer with American Steel & Wire Co., after which he joined Wickwire Spencer as sales manager, wire and springs department. In 1939 he was, in addition, named sales manager, Buffalo district.

✦ ✦ ✦

MR. FOSTER'S retirement comes after about 40 years' active participation in the wire and wire products industries. He first served as president, J. C. Pearson Co., manufacturer of nails; then as assistant general sales manager, American Steel & Wire Co., and for the past ten years as vice president in charge of sales for Wickwire and its subsidiary, American Wire Fabrics Corp.

✦ ✦ ✦

John D. Thompson, Wks. Mgr., John Roebling's Sons Co.

JOHN D. THOMPSON, formerly assistant to the vice-president of the Stanley Works, Bridgeport, Conn., has been appointed works manager of John A. Roebling's Sons Co., Trenton, N. J.

✦ ✦ ✦

MR. THOMPSON was graduated from Yale University in the class of 1925. He assumed his new duties on May 1.

✦ ✦ ✦

Archie Chandler, Vice President, American Pulley Company

ARCHIE CHANDLER has been elected vice-president in charge of sales of the American Pulley Co., Philadelphia. He first became associated with American Pulley in 1915 as district sales manager in charge of the Pacific Coast territory. In 1928 he was named general sales manager of the company.

J. H. Carter, Vice President of Operations, Sharon Steel Corporation

J. H. CARTER, vice president of Pittsburgh Steel Company, has been elected operating vice president of the Sharon Steel Corporation, to succeed J. Milton Hughes. The latter has been transferred to Pittsburgh. **J. Reid Evans,** who has served as secretary and treasurer for many years has been elected treasurer and **A. J. Watson,** formerly assistant secretary has been named secretary. **G. R. Johnston** has been made assistant secretary.

✦ ✦ ✦

F. A. Garvey, Supt. Union Drawn Division of Republic Steel Corp.

FRANK A. GARVEY, assistant superintendent of the Union Drawn division, Republic Steel Corporation, Cleveland, has been promoted to superintendent while **Walter C. Grumpf,** former assistant service manager, has become assistant superintendent. Mr. Garvey joined Union Drawn in 1936, after having served as an industrial engineer and production executive in both the automotive and machine tool industries for 15 years. Mr. Grumpf, who has been with Union Drawn 28 years, had been associated with the Beaver Falls, Pa., plant from 1912 to 1919. **Harry L. Williams** has been promoted from the planning department to assistant service manager, succeeding Mr. Grumpf.

✦ ✦ ✦

American Brass Co. Election of Officers

JOHN A. COE was reelected president of the American Brass Company at a meeting of the directors today. Clifford F. Hollister and Clark S. Judd were named vice presidents. Other officers chosen were Clifford F. Hollister, treasurer; Major W. Judge, S. Burnham Terry, and Edwin J. Rockwell, assistant treasurer; Clifford F. Hollister, secretary; Edwin J. Rockwell, assistant secretary.

✦ ✦ ✦

THE annual meeting of the stockholders was held April 8th and the following directors were chosen: Cornelius F. Kelley, John A. Coe, Clifford F. Hollister, Clark S. Judd, Franklin E. Weaver, James R. Robbins, and Robert E. Dwyer.

✦ ✦ ✦

C. C. Harris, Asst. Ind. Engr., American Steel & Wire Company

CARLE C. HARRIS, the past ten years with Wickwire Spencer Steel Co., New York, as sales engineer, has joined the Cuyahoga works of American Steel & Wire Co., Cleveland, as assistant industrial engineer. Following graduation from Cornell university in 1926, he worked in the open-hearth department of Corrigan, McKinney Steel Co., the wire mill at the Newburg works of American Steel & Wire, and in 1929 was transferred to New York in a sales capacity where he remained until 1930, when he joined the Wickwire company.

✦ ✦ ✦

Wheeling Steel Announces Changes

HUGH B. SCOTT has been appointed assistant vice-president, Wheeling Steel Corp., Wheeling, W. Va. **E. Tyler Davis** has been made assistant to the vice-president, **Nathaniel C. Reed,** general manager of sales, with **W. M. Hall** as assistant general manager of sales, and **Richard F. Sentner** as manager of tin plate sales division.

✦ ✦ ✦

J. A. Greevy, Asst. Gen Mgr., Sharon Tube Co.

JOSEPH A. GREEVY, formerly of the research department of the Stanley Works, Bridgeport, Conn., has been appointed assistant to general manager Meyer Yanowitz at the Sharon Tube Company. He is widely known in the experimental metallurgy field.

✦ ✦ ✦

R. M. Allen, General Manager Sales, Allegheny-Ludlum Steel Corp.

RUSSELL M. ALLEN has been appointed general manager of sales, Allegheny Ludlum Steel Corp., Pittsburgh. Mr. Allen joined the Allegheny Steel Co. as a laborer at the close of the war and was made a clerk in the Pittsburgh sales department in 1921. In the following year he was transferred to the Detroit district sales office where he remained until October, 1925. He then was transferred to the Chicago office as district manager of the Western territory and in April, 1934, returned to Pittsburgh as assistant general sales manager for Allegheny Steel.

✦ ✦ ✦

FOLLOWING the merger of Allegheny Steel Co. and Ludlum Steel Co., Mr. Allen was made assistant to the president of Allegheny Ludlum Steel Corp., which position he held until his new appointment.

✦ ✦ ✦

N. L. Deuble Assistant to Vice President of Copperweld Steel Co.

NORMAN L. DEUBLE is now associated with the Copperweld Steel Company at Warren, Ohio as assistant to the vice president. Mr. Deuble is a graduate of the Case School of Applied Science with the degrees of B. S. and metallurgical engineer; he is a member of the American Society for Metals and of the Society of Automotive Engineers (a member of the iron and steel committee of the S.A.E.). Mr. Deuble was previously with the Republic Steel Corporation and had been associated with the Central Alloy Steel Company and the United Alloy Steel Company.

This is an invitation for you to become a member of The Wire Association. ✦ ✦ ✦ ✦ ✦ ✦

The Annual Dues are $10.00

✦ ✦ ✦

The 1940 Convention will be held in October at Cleveland, O.

✦ ✦ ✦

For Details Address

Richard E. Brown, Secretary
The Wire Association
300 Main St., Stamford, Conn.
Stamford Trust Co. Bldg.

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in April 1940 and April 1939
(In gross tons)

	APRIL 1940	MARCH 1940	APRIL 1939
Wire rods	15,516	19,124	1,791
Strip Steel	12,904	17,360	4,327
Plain, black or galvanized iron or steel wire	11,774	13,802	3,728
Barbed wire and woven wire fencing	2,484	2,449	3,866
Woven wire screen cloth	225	276	164
Wire rope	754	1,011	511
Insulated iron or steel wire and cable—see analysis below			
Other wire and manufactures	2,061	1,343	629
Wire nails	4,414	4,254	1,486
Tacks	70	65	26
Other nails, including staples	373	419	254
Bolts, machine screws, nuts, rivets and washers	1,280	1,199	722
Total, these 11 classifications	51,855	61,302	17,504

Imports of Iron and Steel Wire Into the United States
(In gross tons)

Concrete Reinforcement bars	.....	7	596
Hollow bar and drill steel	183	186	75
Wire rods	1,382	930	638
Barbed wire	44	.....	1,815
Round iron and steel wire	277	170	139
Telephone and telegraph wire	.....	.....	1
Flat wire and strip steel	392	336	264
Wire rope and strand	60	97	296
Other wire	.....	.....	213
Hoops and bands	112	100	1,549
Nails, tacks and staples	17	21	1,419
Bolts, nuts and rivets	24	53	7
Total, these 12 classifications	2,491	1,900	7,012

Exports of Insulated Wire and Cable, April 1940

	Foreign		To U. S. Possessions	
	Pounds	Dollars	Pounds	Dollars
Rubber-covered wire	4,010,723	$1,179,213	97,891	$ 23,730
Weatherproof wire	159,530	34,246	37,853	7,058
Other insulated copper wire	1,062,967	263,863	162,586	29,259
Nickel-chrome electric resistance wire	48,967	62,458	50	50
Total, these 4 classifications	5,282,187	$1,539,780	298,380	$ 60,097

Iron and Steel Exports Sharply Reduced

Imports Register Gain

DOWN 14 percent from the level of the preceding month United States exports of iron and steel products (scrap excepted) in April totaled but 391,754 gross tons valued at $29,223,257. Shipments in March had reached the high level of 457,052 tons valued at $34,220,853, while a year before—in April 1939—this trade had amounted to only 153,884 tons valued at $12,245,537.

✦ ✦ ✦

DESPITE the decline noted above exports accomplished between January 1 and April 30, 1940—1,681,455 tons valued at $127,958,676—were virtually three times as great as those of the comparable period of 1939—585,547 tons valued at $44,802,484.

SHIPMENTS to every continental area except Africa declined in April as compared with March. The trade with Europe totaled only 137,583 tons against 153,326 tons in March, North and Central America and the West Indies took only 65,935 tons as compared with 73,870 tons in the month preceding, South American countries bought only 77,552 tons against 125,874 tons, shipments to the Far East amounted to but 85,502 tons against 89,337 tons, while shipments to Africa alone—largely because of the increased sales to the Union of South Africa—rose to 25,182 tons from 14,645 tons.

✦ ✦ ✦

Imports Higher

AT 6,192 gross tons valued at $1,026,425 imports of iron and steel products (scrap excepted) in April were larger by 22 percent in quantity and 26 percent in value in comparison with March receipts of 5,067 tons valued at $813,303. In April 1939 this trade had totaled 41,314 tons valued at $2,703,082.

✦ ✦ ✦

FROM January through April 1940 only 25,558 tons of iron and steel products valued at $3,424,626 entered the United States—but 23.7 percent by quantity and 48 percent by value of the comparable 1939 trade of 107,970 tons valued at $7,132,191.

✦ ✦ ✦

Scrap Exports Register Gain

AT 221,152 gross tons, valued at $3,575,940, the export trade in scrap in April registered an increase over that of March when shipments had amounted to only 206,925 tons, valued at $3,387,037. April 1939 exports had amounted to 240,124 tons, valued at $3,595,271.

✦ ✦ ✦

THE 1940 trade in scrap continues to lag well behind that of the first four months of 1939. In the current period shipments have amounted to but 850,253 tons valued at $14,667,833, whereas in the first four months of 1939 this trade totaled 1,005,183 tons valued at $14,932,564.

✦ ✦ ✦

United Kingdom Again Leading Market

ALL five of the chief individual country markets took less American steel in April than in March. Exports to the United Kingdom totaled 69,042 tons (78,828 tons in March) which consisted mainly of non-alloy ingots, 48,717 tons; pig iron, 6,329 tons; non-alloy "other" plates, 5,272 tons; and plain shapes, 4,036 tons. The principal items in Canada's 45,721-ton trade (46,266 tons) were non-alloy "other" plates 10,073 tons, non-alloy "black" steel sheets 7,174 tons, plain shapes 6,551 tons, tin plate 4,131 tons, and non-alloy ingots 3,808 tons. Argentina received only 25,859 tons although she had taken 47,859 tons in March, Japan's takings amounted to only 18,450 tons against 22,174 tons, while the trade with Brazil was less than half as great as her March total of 35,563 tons.

Scrap Exports Higher

SCRAP exports in April totaled 221,152 gross tons in registering an increase over the March shipments which had amounted to only 206,928 tons. The leading purchaser of scrap in April was the United Kingdom with total takings of 77,160 tons. Following was Italy with purchases amounting to 74,459 tons, Japan, 38,421 tons, and Canada, 20,710 tons. Included in the 221,152-ton April total is 218,778 tons of iron and steel scrap, 798 tons of tin plate scrap, 530 tons of tin plate circles, 748 tons of waste-waste tin plate, and 298 tons of terne plate clippings, etc.

✦ ✦ ✦

Miscellaneous Items in the April Import Trade

IRON Ore: 257,239 tons (167,325 tons in March). The principal suppliers were Chile, 178,600 tons, Sweden, 50,076 tons, and Cuba, 21,004 tons.

✦ ✦ ✦

MANGANESE Concentrates: 10-35 percent: None (2,876 tons). **35 percent plus—Battery grade:** 2,297 tons (1,054 tons) being furnished by Gold Coast, 1,468 tons, Union of South Africa, 815 tons, and France, 14 tons. **35 percent plus — Other:** 33,401 tons (37,712 tons) with 11,210 tons coming from the U.S.S.R. (Russia), 7,389 tons from the Union of South Africa, 5,466 tons from Brazil, and 3,952 tons from the Gold Coast.

✦ ✦ ✦

CARD Clothing: 23,889 square feet and $35,252 (15,041 square feet, $21,287) furnished entirely by the United Kingdom, 22,016 square feet, $32,558, and Belgium, 1,873 square feet, $2,694.

✦ ✦ ✦

Wood Screws

EXPORTS of iron and steel wood screws during April 1940 totaled 51,924 gross valued at $9,097. Of this total, Colombia took 15,782 gross valued at $3,486; Venezuela, 14,969 gross valued at $2,259; Mexico, 5,876 gross valued at $752; Netherlands W. Indies, 3,280 gross valued at $652; Canada, 2,234 gross valued at $269; Cuba, 2,045 gross valued at $275; Nicaragua, 1,790 gross valued at $425; Guatemala, 1,210 gross valued at $165; Costa Rica, 1,205 gross valued at $166; Argentina, 1,000 gross valued at $113; Republic of Panama, 840 gross valued at $168.

✦ ✦ ✦

EXPORTS of brass wood screws during the same month totaled 7,478 gross valued at $3,989. Of this total Venezuela took 2,508 gross valued at $907; Netherlands W. Indies, 2,280 gross valued at $1,475; Philippine Islands, 705 gross valued at $429; Cuba, 411 gross valued at $192; Costa Rica, 402 gross valued at $152; Other Asia, 284 gross valued at $247; Mexico, 244 gross valued at $171; Republic of Panama, 210 gross valued at $139.

✦ ✦ ✦

IMPORTS of wood screws during the same month were none.

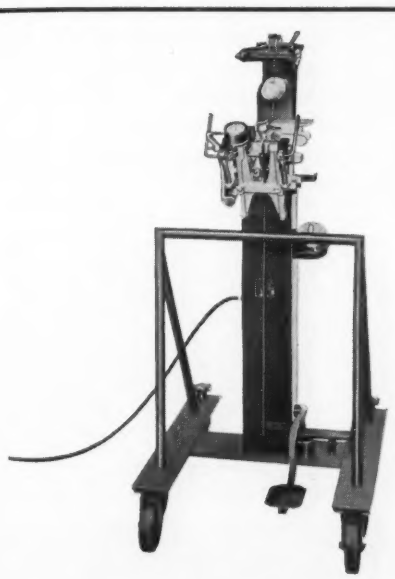
For Information Regarding The Wire Association Address
Richard E. Brown, Secretary
300 Main Street, Stamford, Conn.

MICROMETER PRECISION MICRO-WELD TRADE MARK REG. U. S. PAT. OFF.

CONTINUOUS IMPROVEMENT

MICRO-WELDERS with dial indicating annealing attachments are now available for high carbon wire.

There is positive control of annealing temperature and already hundreds of these special MICRO-WELDERS are proving their dependability and satisfactory performance with leading manufacturers.



MICRO PRODUCTS COMPANY
20 NORTH WACKER DRIVE, CHICAGO, ILL.
Telephone, State 7468

DON'T FORGET—

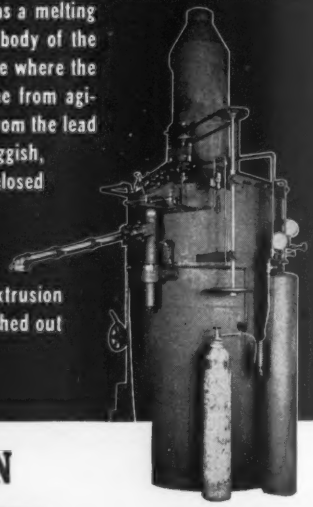
CLEAN LEAD MAKES BETTER SHEATH!

JOHN ROBERTSON CO., INC.
125-137 WATER ST., BROOKLYN, N. Y.

In the Robertson Closed Lead Melting Pot, CO_2 gas is used to keep down the formation of oxides over the lead in the melting pot and also during the process of filling the extrusion cylinder with lead.

The large valve opening with free flow helps to quickly fill the extrusion cylinder; the valve is entirely outside of the melting pot so that it may be easily cleaned and serviced.

The filling tube serves as a melting chamber and the main body of the pot serves as the storage where the molten lead is quite free from agitation. Oxides and dirt from the lead pigs, which may be sluggish, float to the top of the closed quiet storage space and are trapped. Only clean lead is drawn from storage to extrusion cylinder, previously flushed out with CO_2 gas.

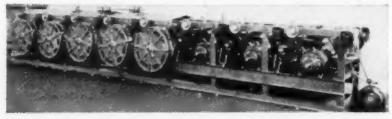


ROBERTSON
LEAD MELTING POT
CLOSED TYPE

Custom-Tailored Arrangement of Motor and Control Equipment Operates Wire-Treating Machines in Massachusetts Plant

MOTOR and control equipment specially tailored to meet the requirements of the job form a drive for a wire-treating machine in the Thompson Wire Company plant at Worcester, Mass. The machine was built by Sleeper & Hartley, Inc., also of Worcester. Seventeen General Electric gear-motors, supplied with d-c power from a motor-generator set, rheostats, and manually operated switches are used on this machine to draw a number of wire strands through a heat-treating furnace at a practically constant speed, adjustable between 30 and 90 feet per minute, to accommodate different heat treatments and different sizes of wire.

✦ ✦ ✦



THE machine consists of a welded-steel frame mounting 16 gear-motors, each having a demountable reel directly on the output shaft, and each having a rider device measuring the diameter of the reel at all times and operating a field rheostat to adjust the speed to compensate for diameter changes. A seventeenth gear motor drives a traverse mechanism feeding all 16 wires back and forth across the face of the reel in order to wind the wire on evenly. This motor has its speed controlled by means of a manual rheostat so that the operator may adjust the speed to change the quality of winding. The armature of this motor is excited from the same source as the armature of all the other motors so that in case the wire speed is changed, the traverse speed will automatically change in the same proportion. Manual switches are provided in the armature circuit of each motor so that the motors can be stopped or started independently.

Lead As A Lubricant In Wire Drawing

(*Continued from Page 356*)

Finish Produced

IN the wire drawing plant, after the first pass the lead-coated wire is brilliantly shiny with a mirror-like surface which strongly reflects light. The silvery appearance of the wire often causes comments by visitors. Figure 3 shows a single holing operation on high-strength high-alloy wire, while Fig. 4 shows continuous drawing on a Waterbury type bench.

✦ ✦ ✦

WITH many nickel-chromium alloy compositions, it is possible to lead coat and draw ¼-inch rod without intermediate annealing of the wire, down to 0.040 or .036. In the manufacture of electrical resistance wires of the 80 nickel 20 chromium, 60 nickel 15 chromium 25 iron, 60 nickel 10 chromium 30 iron, 30 nickel 20 chromium 50 iron, as described in Wire and Wire Products, October 1939 issue, a typical lead-coating breaking-down practice starts at ⅜ or 5/16 rod which is lead coated and single holed down to .114, which from 5/16 rod is an 86+ per cent reduction in area. The wire is then deleaded, annealed, pickled, releaded, and continuously wet drawn from .114 through six, seven, or eight holes to .045, .040, or .036, the last size resulting in a 90 per cent reduction in area. Tungsten and related carbide dies are employed with drawing speeds of several hundred feet a minute. Die wear is slight as a result of the action of the lead. The deleaded wire surfaces are very smooth and clean.

✦ ✦ ✦

Summary

THE use of lead as a lubricant in wire drawing allows the elimination of intermediate anneals and picklings following these anneals, enables the manufacturer to reduce die wear, increase drawing speeds, and achieve lower processing costs. Improved wire surfaces result. The manufacturing procedures are simple and readily controlled.

KONIK
MFD. UNDER U. S. PATENT NO. 1874814
CONTINENTAL
MANUFACTURER'S WIRE
Continental is prepared to meet the specifications of manufacturers for many special kinds of low carbon wire shapes and analyses. Besides special-analysis and copper-bearing steel wire Continental — and only Continental — offers wire of Konik, the patented new steel containing copper, nickel and chromium.
Among the finishes offered by Continental are bright, bright and black annealed; sull-coated; processed; galvanized, including Flame-Sealed; liquored, coppered and tinned in many modifications. Eight shapes are standard and many specials available. Regular gauges run from No. 34 to ⅝ inch. Furnished in coils of suitable sizes, or cut and straightened to specification.
CONTINENTAL STEEL CORP.
General Offices: Kokomo, Indiana
Plants at Canton, Kokomo, Indianapolis
CONTINENTAL
STEEL SHEETS AND WIRE PRODUCTS
Wire: Bright Basic, Annealed, *Konik, Special Manufacturers, Galvanized, *Flame-Sealed
Wire Rods, Nails, Staples, Bale Ties, Barbed Wire; Fence 15 Types; Gates and Fittings
Sheets: Black, Galvanized, Special Coated Roofing and Siding 14 Styles
*Trade Mark Registered, U. S. Patent Office

'Round the World With the Wire Industry

THE War in Belgium, Holland and Luxembourg greatly affects the international wire market. Belgium was the principal European supplier of wire after the outbreak of war and exports amounted to some 7,000 tons of wire rods and 5,500 tons of wire products monthly. The majority of the wire rod exports were to Great Britain and the British wire industry will feel the loss of Belgian supplies sharply. Of the wire exported, the Allies took about 1,500 tons monthly with wire nails and barbed wire in first place, and the rest went overseas. The oversea markets will have to look for a substitute for these deliveries, mainly in the United States, as there is no other source of supply worthy of mention in Europe. Italy ships only small quantities to the Near East and as an immediate consequence prices have gone up for wire products in the Mediterranean and Near East to $5.00 per ton. It is very unlikely, in spite of the further devaluation of the Pound and Franc, that both of these countries can afford to export any considerable quantity of wire products, particularly now that the Belgo-Luxembourgian wire rod supplies are missing. Holland was only a small seller of wire products, mainly wire netting, and supplies can be substituted by other countries.

✦ ✦ ✦

GERMANY continues to export wire products to the Balkans, and now has the whole Scandinavian and Balkan market to supply as well as Switzerland. The wire industry is working up to the limit of capacity. No detailed export figures are known, but merchants report that they could book any quantity for export, if the raw material question, supply of labor and the domestic demand would permit this. The probability is that German wire products exports during the first four months of this year were about 40,000 tons as compared with some 70,000 tons covering the same period last year. Russia imported 3,900 tons consisting mostly of wire rope, steel wire, netting and mesh as compared with only 237 tons during the same period last year. A notable increase was shown in shipments to Denmark, Italy and the Balkan countries, and Switzerland imported 50% more wire from Germany this year than last year. The overseas business was, of course, very small. Moderate shipments went to Japan and China via the Trans-Siberian but consisted mainly of mesh, high grade quality products of ropes, etc., which can sustain the high transport cost.

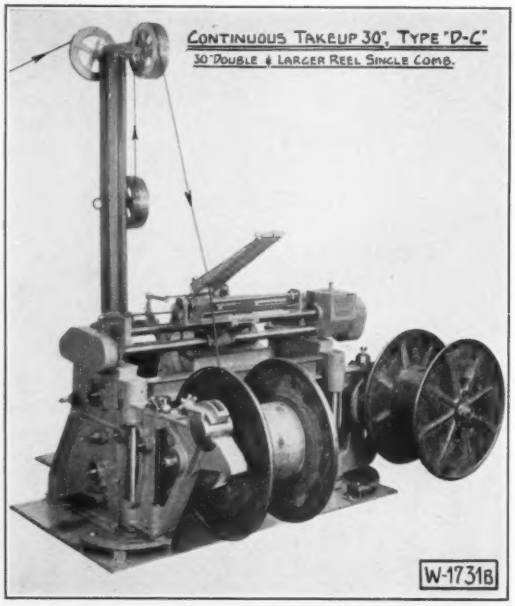
✦ ✦ ✦

WHEREAS early in May prices for wire products were downwards, after May 10th all prices went up, principally wire

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.



Reels Shown in Running & Unloading Positions

Continuous Takeups Type D. C.

Designed for continuous constant-tension reeling of product as delivered to takeup by processing equipment. Commonly employed in Continuous Vulcanizing or Tubing process. Speed variation by hydraulic control synchronizes reeling speed to capstan haul rate. Transfer of product from full to empty reel occurs at full speed. Removal of filled reel and replacement by empty reel is rapidly accomplished. Rugged construction with anti-friction bearings throughout.

nails, which gained up to $6.00 on export markets per ton. In Germany, domestic prices are unaltered.

✦ ✦ ✦

Certain Argentine Imports — March, 1940

ACCORDING to reports of the Office of the American Commercial Attache at Buenos Aires, the March imports of this year included 4,160 tons of wire which originated in the United States.

✦ ✦ ✦

Canadian Exports and Imports Of Wire

CANADIAN imports of wire during March 1940 amounted to $203,753 as compared with $184,992 in February and $158,444 during March 1939. Of the March 1940 imports, $157,810 worth originated in the United States. Total value of imports during the first quarter of 1940 was $583,326, compared with $372,932 during the corresponding period of 1939. Exports of wire during March were valued at $174,199, as against $147,940 in February and $88,079 during March 1939. Total exports for the first quarter of 1940 were valued at $456,439, compared with $279,691 during the first quarter of 1939.

✦ ✦ ✦

Importation of Metallurgic Products—French Indo-China

IN a report submitted by the American Consulate at Saigon, French Indo-China it is stated that the French Ministry of Munitions has informed local importers that France is no longer able to supply French Indo-China with metallurgic products such as iron wire and steel.

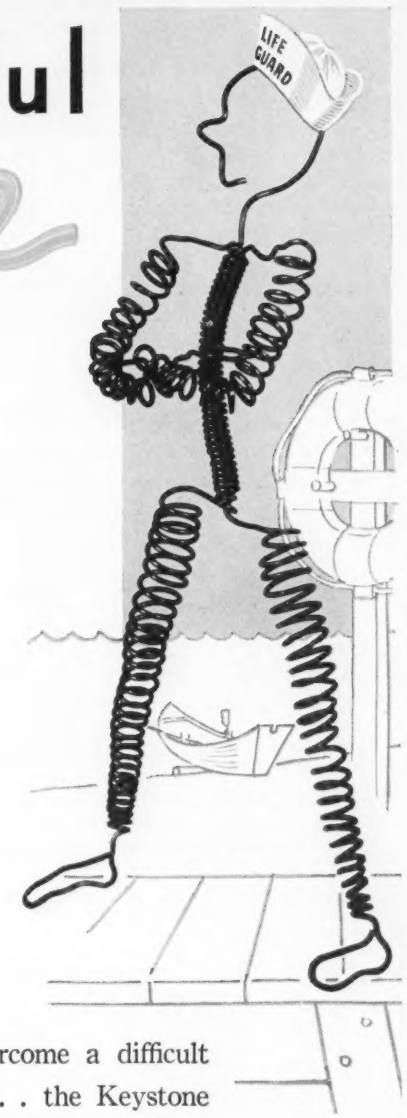
✦ ✦ ✦

Further British Exemptions on Import Duties

FURTHER exemptions have been made by the British Government to import duties on iron and steel products, namely, certain railway and tramway construction material, and the specific parts of tramway and rolling stock, as well as iron and steel bolts and screws for metal, coach screws, rivets,

(*Please turn to page 374*)

Watchful Wire



WHEN production is "hot" and competition is heavy, you're glad to have Keystone wire on the job. Its trustworthy features—steady UNIFORMITY in analysis . . . gauge . . . strength and finish—stand constant guard over the quality of your product. Its dependability avoids many fabrication mishaps.

Why not try a few samples of regularly stocked Keystone wires. Or, if you need a special wire to overcome a difficult combination of problems . . . the Keystone technical staff is at your service . . . It'll pay to find out how this wire can help you relax and still keep "right in the swim."

KEYSTONE

STEEL & WIRE CO., Dept. W. PEORIA, ILLINOIS

HIGH CARBON

or

LOW CARBON

SAMSON SPRING WIRE
REG. U.S. PAT. OFF.
KEYSTONE STEEL & WIRE CO. PEORIA, ILL.

Bright . . . Tinned
Coppered
Annealed
Galvanized

'Round the World With the Wire Industry

(*Continued from page 373*)

nails, wire netting and jack chain. These products have been dutiable at varying rates, in the main at 10 and 20 percent, with a few at 33⅓ percent. In connection with the exemption from duty of the products specified, it should be noted that all of the products so exempted are subject to import license.

✦ ✦ ✦

Cuban Demand for American Nails Increases

IT is reported that during recent months an increasing proportion of the Cuban demand for wire nails is being supplied by American producers, as the domestic nail factory does not appear to be in position to offer the same degree of competition as formerly.

✦ ✦ ✦

Cable Examination by X-Ray

IT is stated that a viewing machine, employed by the Simplex Wire and Cable Co., of America, to determine whether the conductors in high-voltage cable are properly centered, consists of a Westinghouse X-ray outfit installed as a "regular production-line tool." The cable passes through this machine as it leaves the insulation equipment, and an operator sits watching two fluorscopic screens, which present views of the cable interior at 90 degree planes. When a doubtful section of cable is observed the operator presses a switch that exposes two X-ray films, at the same time marking the particular cable section so that it can be rejected if the photographs confirm the visual observation that the conductors are too far from the centre.

✦ ✦ ✦

Sulfatate Facilitates Casting

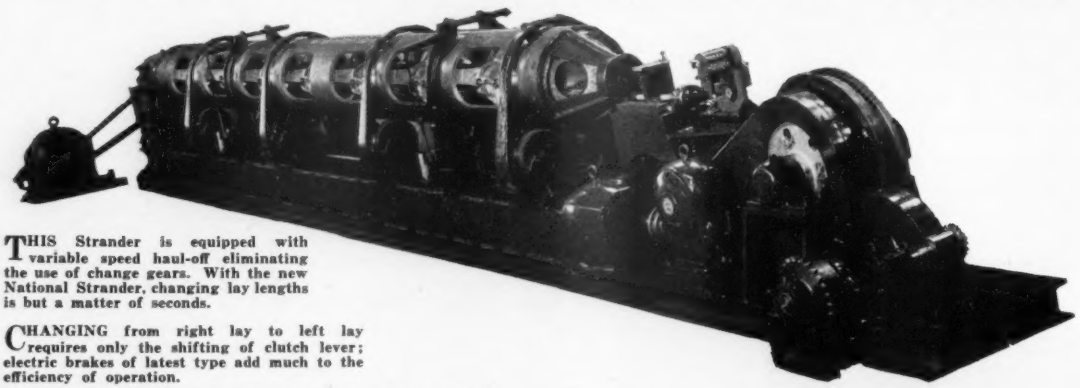
NON-FERROUS metals can now be cast in smooth, fine cores at a considerable saving of time. This is easily accomplished by the addition of a small percentage of Sulfatate, a new type of wetting agent, manufactured by the Glyco Products Co., Inc. The ordinary core for casting non-ferrous metals is usually a combination of silica, sand-clay binder and linseed oil. This type of core is very rough and necessitates a great deal of machining to finish the casting. If, after baking the core, it is dipped into a solution of 1 pint molasses, 10 lbs. graphite, 1 lb. Sulfatate, and water sufficient to make 5 gallons, and then re-baked, the core will present a smooth surface for casting, which will require little if any machining on the casting.

✦ ✦ ✦

THE addition of the Sulfatate eliminates the necessity of hanging the core so that the excess graphite-molasses mixture will drip off. The core, when it is withdrawn from the solution, breaks away cleanly. This not only produces a finer and truer core for casting, but also saves a good deal of time in preparation.

Now Is The Time To Become A Member Of The Wire Association.

NEW NATIONAL 7-WIRE 9" BOBBIN, HIGH SPEED TUBE TYPE STRANDER



THIS Strander is equipped with variable speed haul-off eliminating the use of change gears. With the new National Strander, changing lay lengths is but a matter of seconds.

CHANGING from right lay to left lay requires only the shifting of clutch lever; electric brakes of latest type add much to the efficiency of operation.

THIS Strander is equipped with ball bearings throughout, has Textilite tube rollers and Carboloy wire guides, quick operating bobbin latches and bobbin brakes.

Made for 9", 12", 16" and 22" standard bobbins.
Equipment for Wire and Rubber Industries.

NATIONAL RUBBER MACHINERY CO.

General Office: AKRON, OHIO

Banner Division, COLUMBIANA, OHIO
Eastern Division, CLIFTON, N. J.
David Bridge & Company, Ltd., Manchester, England
The Bawden Machine Company, Ltd., Toronto, Canada

Relative Patenting Speeds

(*Continued from Page 364*)

a surface which is increasing relatively slowly, and partly to the fact that in any event difficulties with block-stripping would soon check any effort to stick to the area curve.

✦ ✦ ✦

BELOW the No. 5 rod junction practice follows the area curve very closely. These furnaces were doubtless designed with a satisfactory rate of heat input for number five rod, and in coarse sizes are unable to heat more pounds per minute regardless of the rod surface available.

✦ ✦ ✦

Theory and Practice of Modern Taping and Stranding

(*Continued from Page 363*)

cable is nearest to capstan surface, prevents the cable from twisting.

✦ ✦ ✦

IN cases where one more bend of cable does not matter, a double grooved capstan is of an advantage. Taping machines with double grooved capstans have proved very successful.

✦ ✦ ✦

Feature I

The taping machine should be designed so that when replacing pads no parts of the machine should be removed; whereby, the pre-set tension and tape guides from pad to point of application will remain undisturbed.

✦ ✦ ✦

A MACHINE built with the above feature involved saves a great deal of time of placing pads and readjustment of tension. Also the operator does not have to be exceptionally skilled to operate such a machine.

This Concludes the Series of Articles on Taping. The Subject of Stranding will be Covered by Articles to be Published Later this Year.

New Coil Spring Plant in Operation

A NEW coil spring plant has been established in Coldwater, Michigan known as the Quality Spring Products Company, Inc. The personnel of this company is as follows:

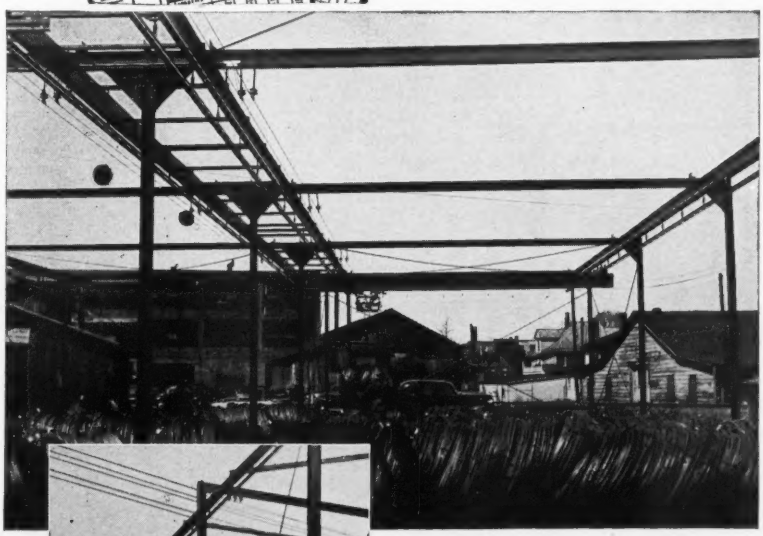
President & Treasurer—**Wilfred T. Donkin**, formerly employed in an executive capacity by The Cleveland Wire Spring Company and recently by Eaton Manufacturing Company of Detroit, Mich.

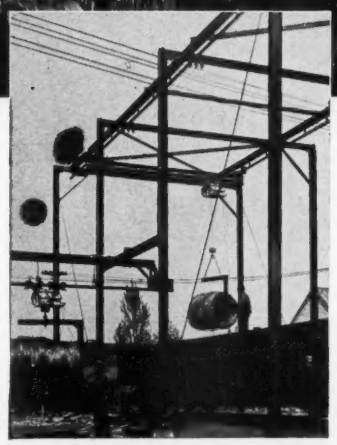
Make your plans now to attend The Annual Wire Association Convention, Cleveland, O., Oct. 21-25, 1940.

Vice-President—**Earl H. Sortwell**, formerly employed as Superintendent of the Coil Spring Division of Eaton Manufacturing Company at Detroit, Mich.

Secretary — **John A. Kennedy**, formerly employed by Eaton Manufacturing Company, of Detroit, in the capacity of Plant Accountant.

"Saves 32c per ton!" in handling cost - - -





Unloading and storing coiled rod from box cars formerly cost 40c per ton and required 5500 sq. ft. of warehouse space.

Now, raw coils are unloaded from gondolas, stored outside and handled through pickling to punches and cold-headers at 8c per ton.

A Clear Saving of 32c per Ton Made Possible by Overhead Handling

Innovations, such as a turntable for transferring coils between hoists, develop in conference with American MonoRail engineers.

AMERICAN MONORAIL CO.

13117 ATHENS AVE., CLEVELAND, OHIO

A Review of Recent Wire Patents

No. 2,199,494, WIRE-DRAWING APPARATUS, patented May 7, 1940 by Charles D. Johnson, Worcester, Mass., assignor to Johnson Steel & Wire Company, Inc., Worcester, Mass., a corporation of Mass.

Each drawing drum has associated with it a chute to deliver the dry lubricant, employed in the drawing operations, onto the wire as it is wound on the drawing drum and also onto the wire-receiving surface of the drum.

✦ ✦ ✦

No. 2,199,495, WIRE-DRAWING APPARATUS, patented May 7, 1940 by Charles D. Johnson, Worcester, Mass., assignor to Johnson Steel & Wire Company, Inc., Worcester, Mass., a corporation of Mass.

The dry lubricant is carried in a chamber formed in the drawing drum within the wire-receiving surface thereof, and is supplied to the wire and this surface through passages leading from the chamber to this surface.

✦ ✦ ✦

No. 2,199,496, WIRE-DRAWING APPARATUS, patented May 7, 1940 by Charles D. Johnson, Worcester, Mass., assignor to Johnson Steel & Wire Company, Inc., Worcester, Mass., a corporation of Mass.

Wire is passed, as it comes from the die, through a rotating container of dry lubricant, this container being supported to rotate in an axis coinciding with the portion of the wire passing therethrough.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 300 Main St., Stamford, Conn.

✦ ✦ ✦

No. 2,200,011, MATTRESS, patented May 7, 1940 by John P. Riley, Chicago, Ill., assignor to S. Karpen & Bros., Chicago, Ill., a corporation of Illinois.

More specifically, the invention lies in the provision of a tuftless wire spring mattress.

✦ ✦ ✦

No. 2,200,942, SPRING CUSHION, patented May 14, 1940 by Arthur Wesley, Chicago, and Lawrence J. Sieger, Cicero, Ill., assignors to Burton-Dixie Corporation, Chicago, Ill., a corporation of Delaware.

A border wire is provided which is held in place without direct attachment to the erect spiral springs with which it is associated.

✦ ✦ ✦

No. 2,200,961, METHOD OF AND APPARATUS FOR ASSEMBLING STRANDS, patented May 14, 1940 by Victor S. Martin, Baltimore, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of N. Y.

This apparatus is said to be adapted to guide and space the strands so that the sheath will lie loosely on the strands.

✦ ✦ ✦

No. 2,202,052, UPHOLSTERY SPRING STRUCTURE, patented May 28, 1940 by William W. Gleason, Chicago, Ill., assignor to Nachman Springfilled Corporation, Chicago, Ill., a corporation of Ill.

A V-shaped supporting bar is provided, and the wire springs attached to and mounted upon it are shaped so as to reinforce and strengthen it.

✦ ✦ ✦

No. 2,202,120, GARMENT HANGER, patented May 28, 1940 by Byron T. Petty, Effingham, Ill.

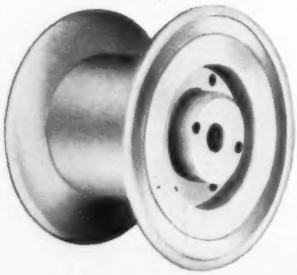
Attached to the offset hook of the wire garment hanger is means to display a price tag, clipped in place.

✦ ✦ ✦

No. 2,202,275, METHOD AND APPARATUS FOR MAKING HELIXES WITHOUT THE AID OF A CORE OR MANDREL, patented May 28, 1940 by David Tulloch, Garwood, N. J., assignor to Diamond Expansion Bolt Company, Garwood, N. J., a corporation of New Jersey.

The apparatus consists of a fixed member, a movable member, stops on the fixed member, a plurality of pivoted

FINE WIRE HIGH SPEED WIRE DRAWING SPOOLS



James Day (Machinery) Ltd.,
Sentinel House,
Southampton Row,
London, W. C. I, England.

MOSSBERG **PRESSED STEEL** CORP.

Announces a complete line of HEAVY DUTY PRECISION SPOOLS and REELS especially designed for high speed wire drawing and annealing.

The degree of efficiency obtained by the HIGH SPEED WIRE DRAWING MACHINE is largely dependent upon the accuracy and durability of the take-up spool.

The use of our PRECISION SPOOLS will increase your machine efficiency and eliminate your spool difficulties.

Complete range of sizes.

MOSSBERG PRESSED STEEL CORP

18 West Street,
ATTLEBORO, MASSACHUSETTS, U. S. A.

COMBINATION
500 lb. CAPACITY WIRE DRAWING — ANNEALING — STRANDING — REEL.

dies carried by the movable member having portions adapted to cooperate with the stops carried by the fixed member, and means to move the movable member to form helixes from the wire or similar material.

✦ ✦ ✦

No. 2,202,442, MANUFACTURE OF WIRE FABRIC, patented May 28, 1940 by Arthur Ernest Blashill, Handsworth, Birmingham, England.

This machine is said to be particularly adapted to weaving square mesh fabric. There are 13 claims to the patent.

✦ ✦ ✦

No. 2,202,538, LINE CONDUCTOR REINFORCEMENT AND TIE, patented May 28, 1940 by Rolf Selquist, McKeesport, Pa., assignor to Copperweld Steel Company, Glassport, Pa., a corporation of Pa.

Reinforcing wire ties are provided, in which the wire is preformed into a helix of considerable length, with its inside diameter about that of the line conductor.

✦ ✦ ✦

No. 2,202,562, CROSSED HELICAL FURNITURE TIE SPRING, patented May 28, 1940 by Carl M. Lind, Waukegan, and John H. Thomas, North Chicago, Ill., assignors to The American Steel and Wire Company of New Jersey, a corporation of N. J.

It is said that the major object is to provide for easy interfastening of the ends of the various springs without any large expense in manufacture of the helical springs.

✦ ✦ ✦

No. 2,202,563, STRIP COILING MACHINE, patented May 28, 1940 by Erik W. Mikealson, Easton, Pa.

A winding mandrel of new design is provided, including means for gradual contraction of the mandrel, when it is employed in the formation of coils from heated strips.

✦ ✦ ✦

No. 2,202,575, ELECTRICAL CABLE AND CONDUCTOR AND PROCESS FOR MANUFACTURING THE SAME, patented May 28, 1940 by Andre Deroche, Fontgombaut, France.

This relates to a process for the manufacture of insulated conductors comprising a mineral insulator compressed between the conductor and an external tubular sheath.

✦ ✦ ✦

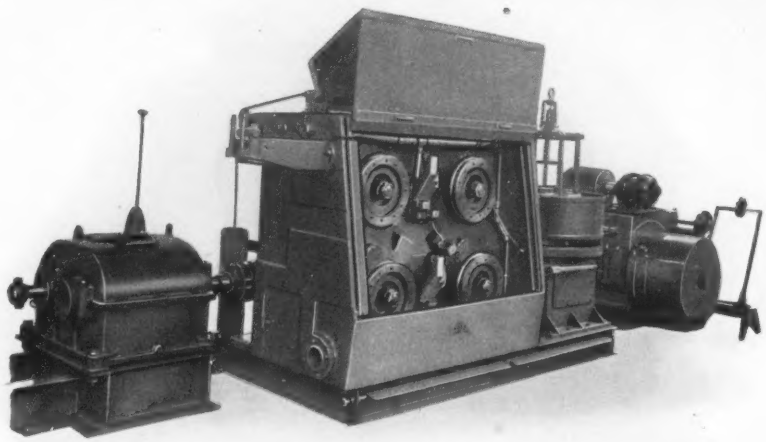
Brass Mill Products Group Merges With C. & B. Research Association

AT meetings of the Copper & Brass Research Association and the Copper & Brass Mill Products Association held here last week, plans were completed for merging the membership of the two associations. The combined association will continue to be known as the Copper & Brass Research Association and will include in its membership 34 fabricating companies, representing about 95% of the fabricators of copper and brass mill products in this country.

✦ ✦ ✦

THE officers elected for the ensuing year were as follows: President—John A. Coe, president of the American Brass Company; Vice Presidents — Wylie Brown, president of Phelps Dodge Copper Products Corporation; Ralph E. Day, president of Bridgeport Brass Company; R. L. Coe, vice president of Chase Brass & Copper Company, Inc.; W. M. Goss, vice president of Scovill Manufacturing Company, and Curtis L. Smith, treasurer of the National Copper & Smelting Company; Treasurer — C. Donald Dallas, president of Revere Copper & Brass, Inc.; Secretary — Bertram B. Caddle; Manager—Theodore E. Veltfort.

Make your plans now to attend The Annual Wire Association Convention, Cleveland, O., Oct. 21-25, 1940.



Flexibility . . . . . .

is the keynote of this Syncro Machine.

An outstanding feature of the new Syncro Type D heavy - intermediate wire drawing machine is its extreme flexibility. It is a combination coiler and spooler machine, driven by an A.C. motor and arranged to obtain three speeds. It enters ¼" soft rod, copper, bronze, brass and other non-ferrous alloys.

To assure top operating economy and efficiency, the type D machine is equipped with easily replaceable blue steel draw block tires of the non-brazed type.

The spooler is smoothly driven by a Syncro Magnetic Slip Clutch and it is equipped with expanding arbors.

Providing the greatest possible flexibility and operating economy, the new type D wire drawing machine is a worthy addition to the Syncro line.

It will pay you to write for complete details.

SYNCRO

Syncro Machine Company

Graybar Bldg., New York — McCormick Bldg., Chicago

Represented in Canada by — Canadian Elevator Equipment Co., Ltd., Toronto.

The Belgian Wire Industry

(*Continued from page 361*)

ed, is a considerable number of hundreds of millions.

✦ ✦ ✦

Sales Organization

THE wire mills of Belgium form a syndicate called "Entente Belge des Denaturateurs de Fil Machine," which has entrusted the Union of Belgian Wire and Nail Mills with a monopoiy of the sales of their products. Among the products covered by this agreement are:

1. Steel wire not exceeding 13 mm diameter in coils or 12 mm on spools, in all shapes and grades up to 100 kilos per square millimeter tensile strength. This includes straightened products, such as bale ties.

2. Wire rod, galvanized wire, lead coated, chrome plated, and stainless, in all grades up to 100 K mm² in coils, on spools, or straightened.

3. Barb wire, galvanized or plain, or painted, regardless of tensile. Strand, clothes line, and other "twisted wire."

4. Nails of all varieties, including all products made on nail machines, whether of wire or otherwise, shoe nails of all varieties, roofing nails, etc.

5. Diamond and hexagon mesh netting.

6. Furniture and bed springs, untempered, single or double spiral, coppered or plain, galvanized, lacquered, enameled, or covered in any way, but not tempered springs.

7. Tinned wire in bundles, spooled, or straight, in all diameters and grades up to 100 K mm².

✦ ✦ ✦

THE Union of Belgian Wire and Nail Mills sells these products direct in the home market. In the foreign market the Union sells direct only straightened products, shoe nails, roofing nails, strand, clothes line, and diamond mesh. The other products, as listed below, are handled by the International Wire Export Co. (IWECO.)

1. All drawn wire, bright, annealed, coppered, oiled, lacquered, or varnished, suitable for nails, for screws, rivets, chains, furniture spring, pins, bottle neck wire, mattress wire, netting wire, band wire round or flat in bundles or spooled, heel slug wire, drawn or cold rolled, welding wire, arc or gas, in coils or spooled, Monier wire, and wire accurately sized for pin manufacture.

2. Galvanized wire, whether drawn or rolled, lead coated or chrome plated wire, "rustless" wire coarser than .006", whether round, half round, oval, triangular or square, plain or crimped, in coils or on spools, and fabricated with material in class 1.

3. Wire with barbs, galvanized or plain, or lacquered, fabricated with material from classes 1 and 2.

4. All nails, including brass plated, coppered, nickled, galvanized or tinned, double headed or twisted, hob nails, spokes for perambulator wheels, tangent spokes, shoe rivets and "Lambert nails."

5. Springs made of mild steel, or of mild steel rods quenched in water, coppered, galvanized, lacquered, enameled or otherwise coated, and springs made of steel of .20 to .30 and of .30 to .40 carbon.

6. Hexagon netting.

✦ ✦ ✦

LASTLY, the following products are sold direct by the wire mills: high tensile wires, rivets, wood screws, machine screws, hinges, screw-eyes, links, hooks, and other details of spring fabric, special meshes, products made of copper, brass, aluminum, and Armco iron, and all other items not specifically reserved for control by the Union.

✦ ✦ ✦

WE have endeavored to give in these paragraphs a word picture of the importance of the Belgian wire industry, the excellence of its facilities, and of its organization. We should like to emphasize the fact that its development has been, in the past, and will in the future continue to be dependent absolutely upon the export market, without which it could maintain neither volume, nor quality, nor satisfactory production costs, nor the ability to execute orders promptly.

THE ANNUAL MEDAL AWARD
OF THE
WIRE ASSOCIATION
FOR THE MOST MERITORIOUS PAPER ON
WIRE MANUFACTURE OR FABRICATION DURING THE YEAR

ALL members of the Wire Association are cordially invited to submit technical papers either for publication in "WIRE & WIRE PRODUCTS" during the year or for presentation before the Annual Wire Association Meeting at Cleveland, October 21-25, 1940.

✦ ✦ ✦

FOR 1940 and subsequent years a medal will be awarded in each of the two major divisions of the activities of the Association, to the papers coming nearest to the requirement set forth above.

✦ ✦ ✦

CONSIDERATION for the Medal Awards is not limited to the papers presented at the Annual Meeting, but is given to all papers submitted by members and published in "WIRE & WIRE PRODUCTS" during the year.

✦ ✦ ✦

SELECTION of papers to be presented at the Annual Convention rests in the hands of the Joint Programme Committee of the Wire Association.

✦ ✦ ✦

ALL papers submitted become the property of the Wire Association, and the Board of Directors constitutes the Committee on Awards.

✦ ✦ ✦

ADDITIONAL information may be obtained by addressing:

RICHARD E. BROWN,
SECRETARY, THE WIRE ASSOCIATION
STAMFORD TRUST CO. BLDG., STAMFORD, CONNECTICUT

Fansteel Publishes Two New Bulletins

THE Fansteel Metallurgical Corporation of North Chicago, Illinois, has just published two new bulletins, as follows:

1. Tantung Brazed Tip Tools for Cutting Steel describes a non-ferrous steel cutting alloy containing tantalum carbide, outlines applications for steel cutting with recommended speeds, and lists prices of tools and tips for brazing.

2. Tantung Welded Tip Tools for Cutting Steel contains explicit instructions for making tools by means of Tantung Welding rod applied to steel shanks by acetylene torch, and lists prices of welding rod and standard welded tip tools.

✦ ✦ ✦

TANTUNG is a new Fansteel development which incorporates the desirable steel cutting properties of tantalum carbide into a relatively low priced cast alloy. It was developed primarily to fill the gap which has existed between high speed steel and cemented carbides in steel cutting application. Tantung is characterized by a red hardness which closely approaches its melting point, and by a remarkable resistance to "cratering" or chip wear when cutting steel or other materials which produce a continuous chip. Tantung tools are capable of heavy roughing or intermittent cuts, and will withstand considerable rough treatment. Copies of these bulletins may be obtained by addressing the Editor of WIRE & WIRE PRODUCTS.

✦ ✦ ✦

Decision of Patent Suit

ON June 22, 1940 a decision was rendered in the District Court of The United States, Southern Division, Eastern District of Michigan in the case of the General Electric Company and Carboloy Company vs. The Willey's Carbide Tool Company.

✦ ✦ ✦

THE suit related to certain methods of production, manufacture and sale of tungsten carbide dies and tools and a decree was rendered in favor of the defendant, The Willey's Carbide Tool Company, The Industrial Diamond Company and Fay H. Willey.

New Finely-Powdered Soap for Dry Drawing Steel Wire and Rods

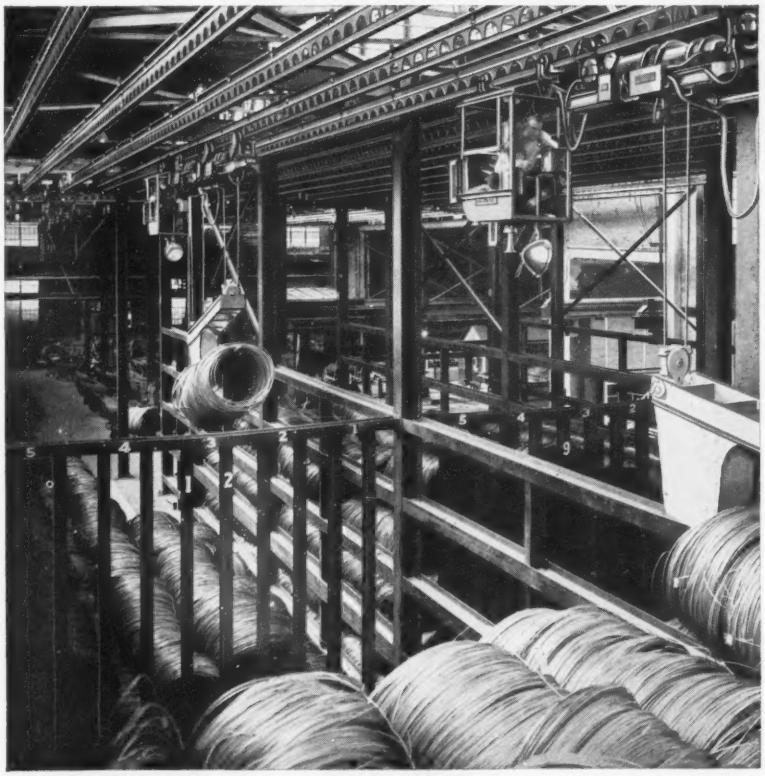
A NEW finely-powdered soap to be used for the dry drawing of steel wire and rods, was announced today by the Technical Service Bureau of National Oil Products Co., of Harrison, N. J.

✦ ✦ ✦

COMPOUNDED through a new and exclusive process, the new product, trade-named NOPCO Soap PX, is said to provide lubrication with higher yields and longer die life and likewise reduce rusting to a minimum.

✦ ✦ ✦

ONE of its chief advantages, according to laboratory technicians who developed the soap, is that it will not deteriorate or develop odor in storage or on drawn stock. In addition, greater quantities of lime can be used with it, they point out, making it economical to use.



HANDLE MORE BUNDLES FASTER WITH A CLEVELAND TRAMRAIL

HAIRPIN HOOK CARRIER

Eleven 300-pound bundles (3,300 lbs. total) of rod can be picked up and transported with a standard Cleveland Tramrail hairpin hook carrier. One operator can handle all operations — pick-up — transportation — delivery — from the cab.

This is just one of the many money-saving developments made by Cleveland Tramrail in the Wire Industry.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1141 Depot Street Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT
Other products: CLEVELAND CRANES and STEELWELD MACHINERY

Wire Association Emergency Advisory Committee

(*Continued from Page 365*)

organizations who might touch upon this field.

✦ ✦ ✦

THE committee meeting in Washington stressed the importance of:—

1. Keeping the Wire Association from any activities which may harm our Association in our Government, our members' or the public's eyes.

2. Not complicating any Emergency program nor duplicating work which is being done by another agency.

3. Educating our members, especially those not normally in touch with our Government, to the needs and specifications of wartime wire and wire products, so that full consideration may be given to these products prior to any emergency.

4. Offering our members a friendly and expert clearing house for war and wartime products information. In many instances our members do not know where to go for specifications, or if they are unable to get the specifications where to go for advice on equipment, procedures or practices to meet the specifications.

✦ ✦ ✦

IT was the feeling of the Committee at the meeting in Washington that the Wire Association can do the most good to our Government and to our members by being helpful in an advisory manner rather than obtrusive in matters which do not fit the functions of our Association.

✦ ✦ ✦

THE committee as appointed by Mr. Beeson, the President of the Wire Association consists of the following:

Chairman, Mr. Ralph K. Clifford, Vice-President of Operations, Continental Steel Corp., Kokomo, Indiana.

Chairman of the Non-Ferrous Division, Mr. Sidney Rolle, Asst. Manager, Scomet Engineering Co., New York, N. Y.

Chairman of the Ferrous Division, Mr. B. L. McCarthy, Chief Metallurgist, Wickwire Spencer Steel Co., Buffalo, N. Y.

Secretary to the Committee and Liaison Officer between the Association and the Military Services, Major Richard E. Brown, Executive Secretary, The Wire Association, Stamford, Conn.

✦ ✦ ✦

SINCE the widest cooperation in this activity is desired, it is earnestly requested that all members of the Association will participate in the activity. A letter addressed to your Executive Secretary advising of your willingness to do so will be appreciated. Criticisms and suggestions of the plan outlined are requested and should be addressed to Major Richard E. Brown, Executive Secretary, The Wire Association, 300 Main St., Stamford, Conn.

✦ ✦ ✦

NEW MEMBERS OF THE WIRE ASSOCIATION
JUNE 1 to JUNE 30

CLEMENTS, W. C., Asst. Met. Engr., Bethlehem Steel Company, Bethlehem, Pa.

HITE, N. L., Sales Mgr., Wire Div., Continental Steel Corp., Kokomo, Indiana

HORNBROOK, H. L., Asst. Sales Mgr., Wire Div., Continental Steel Corp., Kokomo, Indiana

KAHL, ROBERT J., Asst. Supt. Wire Mills, Pittsburgh Steel Co., Monessen, Pa.

KNIGHT, STANLEY S., Metallurgist, Continental Screw Co., New Bedford, Mass.

LENHART, J. C., Supt. Cold Drawn Dept. International Nickel Co., Inc., Huntington, W. Va.

MICHAELSON, FRANKLIN, Production Mgr., Circle Wire & Cable Company, Maspeth, L. I., N. Y.

O'DAY, THOMAS, Supt. Hy-Carbo Steel Company, Lowell, Mass.

OLSON, INGVALD, Salesman, Firth-Sterling Steel Co., Detroit, Michigan

PHIPARD, HARVEY FISK, JR., Pur. Agt., Continental Screw Company, New Bedford, Mass.

POOLE, ERNEST J., JR., Gen. Supt., The Carpenter Steel Co., Reading, Pa.

SHORT, CHARLES P., Sales Repr., Steel Co. of Canada, Ltd., Hamilton, Canada.

This is an invitation for you to become a member of The Wire Association.

The Annual Dues are $10.00

✦ ✦ ✦

The 1940 Convention will be held in October at Cleveland, O.

Ajax-Hultgren Heating Principle Now Applied to Wire in Coils

THE **Ajax-Hultgren** heating principle, whereby heat is generated directly in the liquid salt bath by means of immersed electrodes without the use of heating elements, has now been applied commercially for annealing wire in coils.

✦ ✦ ✦

THE newest application consists of a 150 KW unit in which the pot measures 4 ft. long, 3½ ft. wide, 5½ ft. deep. The electrodes are arranged along the back wall of the pot, and the electromotive forces created between the electrodes produce an automatic circulation of the bath. This insures temperature uniformity throughout the pot contents within 5 deg. F.

✦ ✦ ✦

THIS furnace is used for annealing high carbon SAE 52100 steel wire, and has an hourly production of 1500 lbs. The charge of 750 lbs. is placed in the bath at a temperature of 1275 F. and is brought to temperature within fifteen minutes. The charge is allowed to remain in the bath for an additional few minutes, and is then removed.

✦ ✦ ✦

THE furnace has a working temperature range from 1150 F. to 1500 F.

THE WIRE ASSOCIATION
WHAT IT GIVES YOU FOR $10.00 ANNUAL DUES

1. **WIRE & WIRE PRODUCTS — For One Year.**
   The official publication of The Wire Association covering the Wire Industry; its Metallurgy, Technology, Research, Processes, Machinery and Personnel.
2. **THE ANNUAL BUYERS GUIDE & YEAR BOOK OF THE WIRE ASSOCIATION.**
   The Year Book Section contains: Constitution and By-Laws of The Wire Association; Details of year's meetings, etc.; List of Members, Index to Papers and Articles in WIRE & WIRE PRODUCTS.
3. **QUESTION AND ANSWER SERVICE.**
   Answers to technical and operating problems direct by mail. Available to members only.
4. **ANNUAL CONVENTION AND EXHIBITION.**
   (In Association with American Society for Metals and The National Metal Congress.) Technical Sections, Plant Inspections.
5. **REGIONAL MEETINGS.**
   Attendance at the regional meetings which include Local Plant Inspections, Technical Sessions and Discussions.
6. **PERSONAL CONTACTS.**
   Both at Annual and Regional Meetings, and throughout the year, for interchange of helpful information.
7. **INFORMATION SERVICE ON MACHINERY, EQUIPMENT AND SUPPLIES.**
   The Technical, Catalogue and Correspondence Files of the Wire Association hold the answer to practically every "Where can I buy" problem. This service is available to members without charge.

For detailed information address
RICHARD E. BROWN—Executive Secretary
300 Main Street, Stamford, Conn.

WITH the single exception of the manual switches, all of this equipment was specially tailored to fit the requirements of this particular job. The motors are adjustable-speed motors having a very low speed regulation due to load both at full field and at weak field, and are coupled to General Electric heavy-duty gears for continuous operation. The gate rheostats, designed for long service, have monel-metal buttons and special bearings. They were designed from test data taken on the motors and are so laid out that each button will cause an equal increase or decrease in speed. All of the motors were adjusted at the factory to have the same speed for the same field resistance, to allow the assembly of any one motor with any one rheostat.

✦ ✦ ✦

Republic to Enlarge Stainless Bar And Wire Plant At Union Drawn

EXPANSION of the Union Drawn Steel Division of Republic Steel Corporation of Massillon, was announced by E. M. Richards, corporation assistant vice president in charge of operations. "The expansion will be in the stainless bar and wire department," said D. D. Buchanan, manager of operations, "and will include the rehabilitation of a portion of an existing building, 700 feet by 150 feet in size.

✦ ✦ ✦

WITH the completion of the remodeling, modern equipment will be installed which will provide for a substantially increased capacity for stainless wire and bars.

✦ ✦ ✦

WORK on the building will begin by the middle of June and will be completed within two or three months.

If You Are Not A Member Of The Wire Association — Now Is A Good Time To Join! The Annual Dues Are $10.00

For detailed information address

RICHARD E. BROWN, Secretary

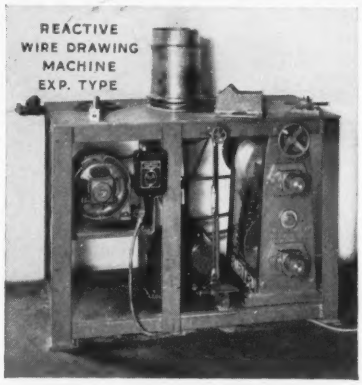
THE WIRE ASSOCIATION

300 Main St., Stamford, Conn.

SINGLE HOLE AND CONTINUOUS PRODUCTION MACHINES

MORE WIRE and BETTER WIRE---At Less Cost

Less Power Per Ton — Lower Die Costs



More Production — Lower Costs Per Ton

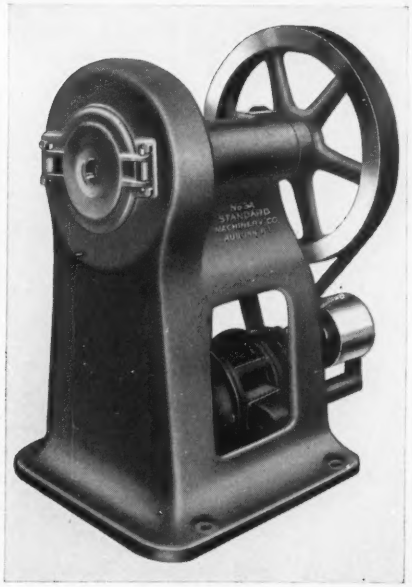
(Manufactured and sold under Smith-Stringfellow Patents)

ADDRESS

REACTIVE WIRE DRAWING

Room #36, Central Exchange Bldg., Worcester, Mass.

Standard Swagers



Available in a complete range of sizes for handling solid stock from ⅛" to 3¾" diameter!

Widely used for every need from pointing wire ends to swaging connections to cable, conduit and hose.

What is your swaging job?

Write for 20 page Catalog SM.

IT'S STANDARD PRACTICE

MACHINERY COMPANY

PROVIDENCE, RHODE ISLAND

For Economical Shaping, Ripping and Finishing Cemented Carbide Dies . . .

NORBIDE ABRASIVE

Norbide is the registered trade mark for Norton Boron Carbide — hardest material ever made by man for commercial use.

NORTON COMPANY
Worcester, Mass.

N-48

Bell-Mine Pulverized Lime

FOR WIRE DRAWING

WARNER COMPANY Lime Bell Mine Product BELLEFONTE DIVISION

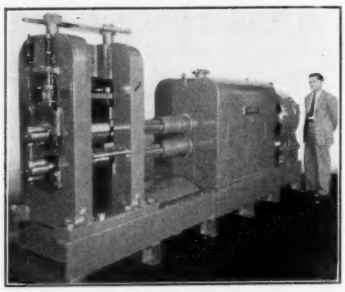
"Bell-Mine" Lime is free from grit
and other impurities
.....has a high guaranteed
content of Calcium
.. is unusually slow settling
in the milk of Lime Box
.. is truly economic in use.

Warner Company
BELLEFONTE DIVISION
SALES OFFICES: PITTSBURGH, PHILADELPHIA, BELLEFONTE, N. Y. CITY.

Rolling Mill of Welded Construction Built for Purdue University

PURDUE University has recently installed a Farrel-Birmingham metal rolling mill which incorporates a number of interesting features. This mill, which is intended for experimental purposes, is of welded construction and is designed to perform either hot or cold rolling of metals.

✦ ✦ ✦



IT is an 8" x 12" two-high, plain-bearing rolling mill, with the mill, reduction drive and pinion stand and motor mounted on a common bedplate to form an integral unit. The mill housings, drive case and bedplate are all fabricated from rolled steel plate and welded.

✦ ✦ ✦

TO permit either hot or cold rolling, two pairs of interchangeable forged steel rolls are furnished with the mill. The first pair is of suitable composition and hardness for cold rolling. The second pair, which can be substituted for the first pair, as the nature of the operation demands, is designed for hot rolling.

✦ ✦ ✦

Combined Reduction Drive and Pinion Stand

THE mill is driven by a direct current, variable speed motor through an enclosed double reduction drive with integral pinion stand. The reduction drive is the vertical type, with all gear centers in one vertical plane. Gears and mill pinions are the Sykes continuous tooth, double helical type. All shafts are mounted in anti-friction roller bearings. The base for the drive and pinion stand is an oil-tight chamber built into the bedplate. A welded steel cover bolted to the bedplate encloses the entire drive unit and pinion stand. The

drive is equipped with an oil pump and filter, which provides force feed lubrication to all gears and bearings. The motor is connected to the drive by a Farrel Gearflex flexible coupling. Four-pod spindles and couplings connect the mill and pinion stand.

✦ ✦ ✦

New Type Electric Welding Machine

THE **Eisler Engineering Company of Newark, New Jersey** has introduced a 5 KVA high speed production **Spot Welder.** This welder is an air operated, vertical press type machine supplied with a suitable automatic timer and contactor.

✦ ✦ ✦

THERE are two operators for this welder, one to load the welding fixture and the other to operate the foot switch and slide the fixture along after each weld.

✦ ✦ ✦

THE objects shown in the photo are cylindrical shaped tubes, to which small flat pieces of metal are being spot welded. The operator can attain a speed of 150 spots per minute.

✦ ✦ ✦

THIS machine will easily adapt itself for many other types of spot welding jobs.

INFORMATION If You Please

RODINE, in the pickling bath, saves acid and metal, minimizes brittleness, lowers pickling costs.

RODINE more than pays its way.

CUPRODINE creates a bright, tight, uniform copper coating in a minimum of time. It is used in a simple immersion process, without current.

Bulletins on request.

American Chemical Paint Co.
Dept. 306, AMBLER, PENNA.
Detroit, Mich. Walkerville, Ont.

NEW 99% SOAP INSURES CORRECT LUBRICATION

Nopco's new Soap LX has been prepared especially for the dry drawing of steel wire. Its superiority is due to its actual soap content—99% active dry soap.

Because of this high pure soap content, Nopco Soap LX possesses plus values that will effect economy in your drawing operations.

Free from glycerine, salt or fillers of any kind, Nopco Soap LX insures correct lubrication with longer die life, better finish and higher yields per pound of soap.

Write for a Technical Data Bulletin or better still, order enough for a trial—see for yourself.

NOPCO
NATIONAL OIL PRODUCTS CO.
HARRISON N. J.
BOSTON · CEDARTOWN GA. · CHICAGO · SAN FRANCISCO

More Tonnage per Pound!

You can get a much higher tonnage of steel wire per pound of lubricant, insure longer die life and maintain better finish, with

MAGNUS WIRE DRAWING COMPOUNDS

Specially formulated to meet the definite conditions of wire size, type of drawing operations and other factors you face in your mill. There's a Magnus lubricant to suit your problems exactly on both wet and dry drawing operations.

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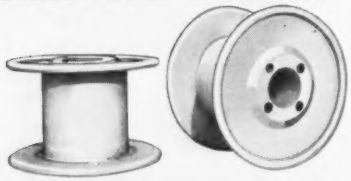

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Steel Welding Wire Output in 1939 Reached Peak of 91,718 Net Tons

PRODUCTION of steel welding wire in 1939 rose to the record-breaking total of 183,436,000 pounds, according to information received by the American Iron & Steel Institute.

✦ ✦ ✦

WELDING wire output in 1939 represented an increase of 56% over the 1938 figure of 117,395,000 pounds and was 18% greater than production in 1937 of 155,310,000 pounds, the highest total previously recorded.

✦ ✦ ✦

BETWEEN 1932 and 1939 the production of steel welding wire rose 760%, more than double the increases in total amount of steel produced during the period.

✦ ✦ ✦

REFLECTING the more extensive uses of welding processes, particularly by manufacturers of products in which steel is used, more than five pounds of welding wire were produced per net ton of finished steel last year, compared with 2.6 tons in 1932.

Self-Fluxing Paste Solder

REMARKABLE reductions in labor costs are being shown in practical tests of a soldering material recently introduced to the industrial field by its manufacturer, Wayne Chemical Products Co., Detroit, Mich.

✦ ✦ ✦

THE material, a self-cleaning and self-fluxing paste solder, is being marketed under the name, "Meltomatic Paste Solder". Because it simplifies soldering and tinning, the manufacturers predict that these practices will be greatly revolutionized, since much of the usual paraphernalia necessary to do this type of work can be dispensed with. There is no need for the melting pot, the bar solder, the soldering iron, or the flux. All that is required now is a brush to apply the material and a heat source.

✦ ✦ ✦

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nace. It will melt at a temperature slightly higher than 400° Fahrenheit—even with the heat of a lighted match.

✦ ✦ ✦

BY this method the job can be done quickly because there is no time spent in first cleaning the surface of the metal, which represents a great saving of labor. Nor is material wasted because there is no excess to melt and drop off; only enough Meltomatic is used to cover the area to be bonded. Since the material is brushed on the entire surface where bond is to be made, an even distribution is achieved which results in obtaining a solid contact far stronger than one in which only the edges are soldered.

✦ ✦ ✦

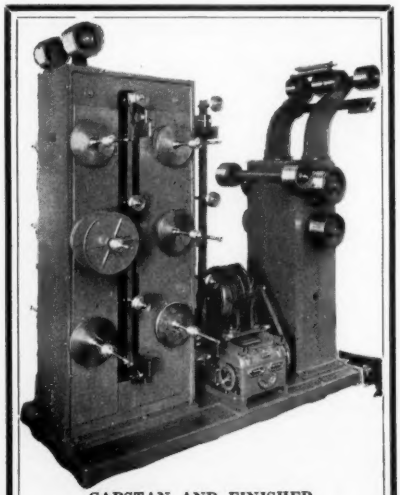
THE development of Meltomatic brings to industry many advantages over bar solder. In addition to expediting normal soldering and tinning work, it facilitates soldering of small articles where irons are usually difficult to manipulate, and it permits one to reach small spaces not accessible with ordinary solder stock. It also makes possible the simultaneous soldering of several articles or units—a task which heretofore presented a problem.

✦ ✦ ✦

"A MANUFACTURER, in tinning ends of braided wire," stated Edgar Behr, president of the Wayne Chemical Products Co., "now merely coats them with Meltomatic, melts the solder with a flame and wipes. The job is accomplished in about half the time consumed doing it the old way of dipping the ends of the wires first into flux, next into the pot of molten solder, and then shaking off the excess solder."

✦ ✦ ✦

"IN still another plant," continued Mr. Behr, "the Meltomatic method has effected savings by eliminating the work of cleaning acid rust spots which always appeared after the soldering operations. With Meltomatic there is no danger of having liquid flux cause corrosion of adjacent surfaces because Meltomatic is applied only on areas to be soldered."



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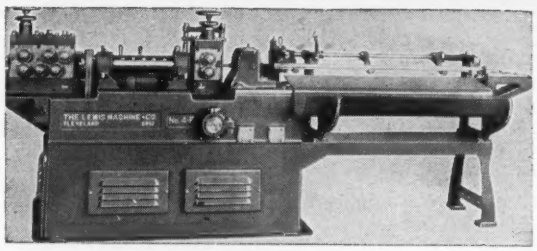

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A Needed Curb on Federal Administrative Law

"THE first genuine attempt to curb the mushroom growth of 'administrative law' so irksome to individual enterprise and so dangerous to individual liberty," is the description applied to the Logan Bill (Senate 915) now before Congress by Messrs. A. W. Rucker and N. W. Pickering in a study just published by Farrel-Birmingham Company, Inc., of Ansonia, Connecticut.

✦ ✦ ✦

IN a succinct review of the conditions which have led to the introduction of the Logan Bill, the authors say: "The time-honored process of writing specific legislation in Congress, administering but not altering it in the executive branch of government and testing its constitutionality in the courts has, under the New Deal, rapidly been converted into a process of delegating to bureaus, commissions, and boards what amounts to power to act simultaneously as legislative, executive and judicial agencies. This development, passing under the polite name of 'The Administrative Process,' has provided the means whereby reformers can put their peculiar economic and social conceptions into effect without permitting doubts as to the constitutionality thereof, however reasonable, to deter them.

✦ ✦ ✦

"THIS power over the interests and liberties of individuals as well as partnerships and corporations arises from the inclusion in the Railway Labor Act, Walsh-Healy Act, Wagner Act and Fair Labor Practices Act of the provision, 'The board (administrator, agency, commission) shall have authority to make, amend and rescind such rules and regulations as may be necessary to carry out the provisions of this act.' Combined with another provision reading '. . . findings of fact by the administrator (board, agency, com-

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mission) shall be conclusive; . . . the review of the court shall be limited to questions of law,' it is easy to realize the opportunities offered for converting a government of laws into a government of men. These provisions are in one form or another common to most New Deal legislation, particularly that affecting the interests of labor and industry.

✦ ✦ ✦

"THE Logan Bill," continue Messrs. Rucker and Pickering, "strikes at three evils which characterize all bureaucratic operation: (1) Delay in the issuance of regulations under which a given law will be administered, with consequent uncertainty so hampering to enterprise, and regulations issued without notice. (2) Arbitrary decisions contrary to evidence and reason. (3) Restriction of the right of court appeal, especially as regards findings of fact, by aggrieved parties."

✦ ✦ ✦

SOME of the provisions in the Logan Bill correcting these evils are as follows:

✦ ✦ ✦

"SECTION 2 requires those charged with the administration of any statute to issue no regulations except after notice and public hearings. Sub-Section 2-b provides that all administrative agencies shall issue regulations within one year after passage of any new statute." This would eliminate the hampering delays, "inevitable confusion, uncertainty and doubt which heretofore has often attended the application of Federal reform statutes. Sub-Section 2-c contains an additional safeguard against arbitrary regulation. It provides that any person substantially interested in the operation of a law may bring about reconsideration of any regulation even though no case in point is at issue . . . The Logan Bill also provides for judicial review of 'administrative law'

(*Please turn to Page 388*)

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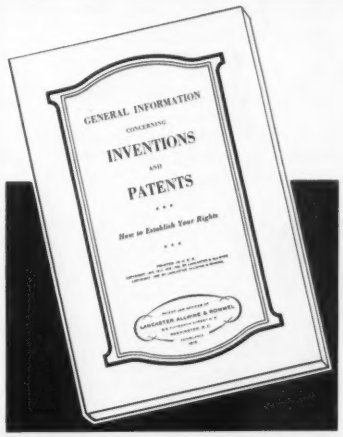

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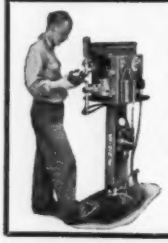
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A Needed Curb on Federal Administrative Law

(*Continued from Page 387*)

prior to its application, and undertakes in Section 4 to develop more concretely the judicial character of commissions and boards.

✦ ✦ ✦

"IT is generally conceded," assert the authors, "that much of the benefits of the administrative process have been lost by the biased wording of statutes which removes from judicial review the administrative agency findings of fact. Perhaps no other provision in New Deal legislation has been so instrumental in destroying confidence in democratic processes and instilling doubt and uncertainty as to the future. The results, insofar as they have deterred economic recovery, are plainly visible. The Logan Bill would automatically bring administrative agencies to a strict accounting through its Section 5," which provides that the courts may review findings of fact as well as of law.

✦ ✦ ✦

"ENACTED into law," say Messrs. Rucker and Pickering "this provision would be a notable gain for democratic processes and correspondingly a crushing defeat for those who, wittingly, are engaged in a process of establishing in the United States a dictatorship on the installment plan."

✦ ✦ ✦

THE authors conclude: "The Logan Bill will, of course, be bitterly fought by various pressure groups whose administrative power or opportunity to use the nation as an experimental station for sociological theories will be curtailed. That is to be expected. This type of opposition should not deter Congress from enactment of the Logan Bill and resumption of its own powers of legislation, or at least the exercise of control over the 'administrative process' of interpreting legislation. Through this one bill, Congress can do much to revive confidence in democratic processes and bring about a crystallization of sound executive policy essential to future economic progress."

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CUTTING TOOLS—Carbide
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Vascoloy-Ramet Corp., North Chicago, Ill.

DIAMOND POWDERS—
Rusch Wire Die Corp., New York, N. Y.

DIAMOND TOOLS—
Rusch Wire Die Corp., New York, N. Y.

DIES—Diamond
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Cochaud Wire Die Co., New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Krause & Co., Inc., F., Jersey City, N. J.
Rusch Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Lead Extrusion
Robertson, John, Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Cochaud Wire Die Co., New York, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Krause & Co., Inc., F., Jersey City, N. J.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Rod and Tube Drawing
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DIES—Tantalum Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Carboloy Co., Inc., Detroit, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., New York, N. Y.
Vascoloy-Ramet Corp., North Chicago, Ill.
Vianney Wire Die Works, New York, N. Y.
Willey's Carbide Tool Co., Detroit, Mich.

DRAW BENCHES—
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Standard Machinery Co., Providence, R. I.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRUMS—Flange Steel
Stevens Metal Products Co., Niles, O.

DRUMS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

ENGINEERS—Consulting Wire Mill
Hartley, George D., Worcester, Mass.
Lewis, Kenneth B., Worcester, Mass.

EQUIPMENT—Insulation Testing
Entwistle, James L., Pawtucket, R. I.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FLASH BAKERS—
Morrison Engineering Corp., Cleveland, O.

FURNACES—Annealing
Carl-Mayer Corp., The, Cleveland, O.
Drever Co., The, Philadelphia, Pa.
Electric Furnace Co., Salem, O.
Lee Wilson Engineering Co., Cleveland, Ohio
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Automatic
Carl Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Lee Wilson Engineering Co., Cleveland, Ohio
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Brazing
Electric Furnace Co., Salem, O.
Firth-Sterling Steel Co., McKeesport, Pa.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.
Lee Wilson Engineering Co., Cleveland, Ohio
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Electric
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Hardening and Tempering
Carl Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
Robertson, John, Co., Brooklyn, N. Y.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Non-Oxidizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Normalizing
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Salt Bath
Electric Furnace Co., Salem, O.
Surface Combustion Corp., Toledo, Ohio.

FURNACES—Wire, Strip & Sheet
Carl-Mayer Corp., The, Cleveland, Ohio.
Electric Furnace Co., Salem, O.
Lee Wilson Engineering Co., Cleveland, O.
Morrison Engineering Corp., Cleveland, O.
Surface Combustion Corp., Toledo, Ohio.

GALVANIZING EQUIPMENT—
Lee Wilson Engineering Co., Cleveland, Ohio

GRINDERS—ROLL
Norton Co., Worcester, Mass.

HI-SPEED BAKERS—
Carl-Mayer Corp., The, Cleveland, Ohio.

HOISTS—Electric Traveling
American Monorail Co., Cleveland, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

INHIBITORS—
American Chemical Paint Co., Ambler, Pa.
National Oil Products Co., Harrison, N. J.

INSTRUMENTS—Electrical
Entwistle, James L., Pawtucket, R. I.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—
Warner Co., The, Bellefonte, Pa.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Magnus Chemical Co., Garwood, N. J.
Miller Co., R. H., Homer, N. Y.
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

LUBRICANTS—Wire Drawing
Magnus Chemical Co., Garwood, N. J.
Miller Co., R. H., Homer, N. Y.
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Robertson, John, Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Sub. of Thomson-Gibb Electric Welding Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Sub. of Thomson-Gibb Electric Welding Co., Lynn, Mass.

MACHINERY—Bunching
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Mach'y. Co., Phila., Pa.
Entwistle, James L., Pawtucket, R. I.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Sub. of Thomson-Gibb Electric Welding Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Coilers
Broden Construction Co., Cleveland, O.
Entwistle, James L., Pawtucket, R. I.
Morgan Construction Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Copper Wire Drawing and Rolling
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Covering Wire
Fidelity Machine Co., Philadelphia, Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Cutting
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
Moslo Machinery Inc., Cleveland, O.
National Machinery Exchange (Used), New York, N. Y.
Shuster, F. B., Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Die Making
Firth-Sterling Steel Co., McKeesport, Pa.

MACHINERY—Draw Benches
Standard Machinery Co., Providence, R. I.

MACHINERY—Edging
Standard Machinery Co., Providence, R. I.

MACHINERY—Enameling
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Extruding
Robertson, John, Co., Brooklyn, N. Y.
Royle, John & Sons, Paterson, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, O.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Forming
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Galvanizing
Lee Wilson Engineering Co., Cleveland, Ohio

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Lee Wilson Engineering Co., Cleveland, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
Fidelity Machine Co., Philadelphia, Pa.
Ruesch, H. J., Machine Co., Newark, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Rahway, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Philadelphia, Pa.

MACHINERY—Lead Encasing
Robertson, John, Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
Robertson, John, Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.

MACHINERY—Magnet Wire
American Insulating Mach'y. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Material Handling
American Monorail Co., Cleveland, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

MACHINERY — Measuring Wire & Cable
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Glader, Wm., Machine Works Co., Chicago, Ill.
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Pointing
Broden Construction Co., Cleveland, O.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Rubber for Insulating Wire
National Rubber Machinery Co., Akron, O.
Royle, John & Sons, Paterson, N. J.

MACHINERY—Rubber Strip Covering
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y. Co., Phila., Pa.
Broden Construction Co., Cleveland, O.
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I. (Special Designs)
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spooling
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
National Machinery Exchange (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
Lewis Machine Co., The, Cleveland, O.
Moslo Machinery, Inc., Cleveland, O.
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Shuster, F. B., Co., New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., The, Torrington, Conn

MACHINERY—Stranding
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Sub. of Thomson-Gibb Electric Welding Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Construction Co., Cleveland, O.
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Swaging
National Machinery Exchange (Used), New York, N. Y.
Ruesch, H. J., Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Taping
American Insulating Mach'y. Co., Phila., Pa.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Sub. of Thomson-Gibb Electric Welding Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing
Entwistle, James L., Pawtucket, R. I.
Scott, Henry L., Co., Providence, R. I.

MACHINERY—Testing Size of Wire
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Testing—Spring
Standard Machinery Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y. Co., Phila., Pa.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
Ruesch, H. J., Machine Co., Newark, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

MACHINERY—Welding Wire
Eisler Engineering Co., Inc., Newark, N. J.
Micro Products Co., Chicago, Ill.
Shuster, F. B., Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Sub. of Thomson-Gibb Electric Welding Co., Lynn, Mass.

MACHINERY—Winding
American Insulating Mach'y. Co., Phila., Pa.
Entwistle, James L., Pawtucket, R. I.
Fidelity Machine Co., Philadelphia, Pa.
New England Butt, Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Mach'y. Co., Phila., Pa.
Broden Construction Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
National Machinery Exchange (Used), New York, N. Y.
Reactive Wire Drawing, Worcester, Mass.
Ruesch, H. J., Machine Co., Newark, N. J.
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Machinery Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.
Thomson-Judd Wire Machinery Co., Sub. of Thomson-Gibb Electric Welding Co., Lynn, Mass.
Torrington Mfg. Co., The, Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Machine Co., Waterbury, Conn.

MACHINERY—Wire Measuring
Watson Machine Co., Paterson, N. J.

WHERE TO BUY, Continued

MACHINERY—Wire Rope
National Rubber Machinery Co., Akron, O.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Sub. of Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y. Co., Phila., Pa.
New England Butt, Co., Providence, R. I.
Syncro Machine Co., Rahway, N. J.

MACHINERY—Wood Screw
National Machinery Exchange (Used), New York, N. Y.

MATERIAL HANDLING EQUIPMENT—
American Monorail Co., Cleveland, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

MILLS—Tandem Rolling and Edging
Standard Machinery Co., Providence, R. I.
Torrington Mfg. Co., The, Torrington, Conn.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

OILS—Wire Drawing
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

OVENS—Industrial
Carl-Mayer Corp., Cleveland, Ohio.
Morrison Engineering Corp., Cleveland, O.
Ross Engineering Corp., J. O., New York, N. Y.

PANS—Vulcanizing
Mossberg Pressed Steel Corp., Attleboro, Mass.

PAPER TESTERS—
Scott, Henry L., Co., Providence, R. I.

PATENT ATTORNEYS—
Lancaster, Allwine and Rommel, Washington, D. C.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.
National Oil Products Co., Harrison, N. J.

PLASTIC TESTERS—
Scott, Henry L., Co., Providence, R. I.

POTS—Lead Melting
Robertson, John, Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
Robertson, John, Co., Brooklyn, N. Y.
Standard Machinery Co., Providence, R. I. (Mechanical Only)

PRESSES—Lead
Robertson, John, Co., Brooklyn, N. Y.

PULLERS—Wire
Scudder, E. J., Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
Robertson, John, Co., Brooklyn, N. Y.

REACTIVE WIRE DRAWING
Reactive Wire Drawing, Worcester, Mass.

RECORDERS—Fault and Reel
Entwistle, James L., Pawtucket, R. I.

REEL AND TENSION STAND—
Fidelity Machine Co., Philadelphia, Pa.
Moslo Machinery, Inc., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Rahway, N. J.
Torrington Mfg. Co., The, Torrington, Conn.

REEL CRUTCHES—
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Apco Mossberg Co., Attleboro, Mass.
Moslo Machinery, Inc., Cleveland, O.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster Co., F. B., New Haven, Conn.
Stevens Metal Products Co., Niles, O.

REELS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS AND SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

REELS—Takeoff
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Moslo Machinery Inc., Cleveland, O.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B. Co., New Haven, Conn.
Stevens Metal Products Co., Niles, O.

REELS—Vulcanizing and Impregnating
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Shuster, F. B. Co., New Haven, Conn.
Stevens Metal Products, Co., Niles, O.

REELS—Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Moslo Machinery, Inc., Cleveland, O.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products, Co., Niles, O.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS
Carl-Mayer Corp., The, Cleveland, O.
Morrison Engineering Corp., Cleveland, O.
Moslo Machinery, Inc., Cleveland, O.
Ross Engineering Corp., J. O., New York, N. Y.

RODS—Wire—Non-Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

ROLL STRAIGHTENERS—
Moslo Machinery, Inc., Cleveland, O.

RUBBER AND RUBBER COMPRESSION TESTERS—
Scott, Henry L., Co., Providence, R. I.

RUST PROOF COMPOUND—
American Lanolin Co., Lawrence, Mass.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.

SKIN PROTECTOR—
Magnus Chemical Co., Garwood, N. J.

SOAPS—Industrial and Wire Drawing
Magnus Chemical Co., Garwood, N. J.
Miller, Co., R. H., Homer, N. Y.
National Oil Products Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago, Ill.

SPARK TESTING EQUIPMENT—
Entwistle, James L., Pawtucket, R. I.

SPOOLS—Annealing and Wire Drawing
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Chicago, Ill.

SPOOLS—Shipping and Shop
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

SPOOLS—Steel
Apco Mossberg Co., Attleboro, Mass.
Hayward Co., R. B., Chicago, Ill.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Stevens Metal Products Co., Niles, O.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass and Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

STRIP—Steel
Bethlehem Steel Corp., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.

STRIP METAL TESTERS—
Scott, Henry L., Co., Providence, R. I.

SWIFTS—Take-off
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Attleboro, Mass.

TAKE-UPS FOR CABLE, HOSE, LEAD PRESSES AND SHEET RUBBER—
Entwistle, James L., Pawtucket, R. I.

TANKS—Acid
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Lead Lined
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Pickling
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Rubber Lined
Hauser-Stander Tank Co., Cincinnati, O.

TANKS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

TANKS—Wooden
Hauser-Stander Tank Co., Cincinnati, O.

TENSILE TESTERS—
Scott, Henry L., Co., Providence, R. I.

TESTING INSTRUMENTS—
Entwistle, James L., Pawtucket, R. I.
Scott Co., Henry L., Providence, R. I.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS—
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS—
Ruesch, H. J., Machine Co., Newark, N. J.

TURKS HEADS—Friction and Power Driven
Standard Machinery Co., Providence, R. I.

VULCANIZERS—
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS—
American Insulating Mach'y. Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.
Moslo Machinery, Inc., Cleveland, O.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Enameled For Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification For Special Purposes
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Stainless Steel
Firth-Sterling Steel Co., McKeesport, Pa.

WIRE—Steel—Also Coppered Steel——Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE AND STRIP—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE TESTERS—
Scott, Henry L., Co., Providence, R. I.

WIRE, WEAVING—Non Ferrous
Hudson Wire Co., Ossining, N. Y.

YARN TESTERS—
Scott, Henry L., Co., Providence, R. I.

This is NEWS!

Volume I—No. 6 New York, N. Y., April 26, 1940

NATIONAL METAL EXPOSITION SPACE OVER-SUBSCRIBED SEVEN MONTHS IN ADVANCE OF OPENING OCTOBER 21

...Y. WORLD'S FAIR ...DY FOR MAY 11 ...GES

Private Buildings Erected by 38 Companies At Tulsa Show

TULSA, April 26—Over 600 companies which have a stake ...dustry are busy setting up exhibits here for the ...ational Petroleum Exposition. Although the ... been busy

A M A Will Use Four Floors at N. Y. Meet

NEW YORK, April 26—The Scientific and Technical Exhibits of the American Medical Association will be held at Grand Central Palace here June 10 to 14 during the convention. The ...sual number of exhibitors—...out 300—are expected. Four ...ors of the building will be ...d for displays.

...convention has not been ...e city for many years. ...World's Fair as an ...tion it is believed a ...tance may be ex... ...ear the convention ...t. Louis.

...LISTS ...ICAL ...940

HEAVY DEMAND FOR METAL SHOW SPACE MORE TO BE ADDED

Over 86,000 Square Feet Reserved—More Space Than Used in 1939

CLEVELAND, April 26—An unexpected heavy demand by exhibitors in previous shows for floor space in the 1940 National Metal Exposition has made necessary the laying out of a new plan which will have several thousand additional square feet of floor space. This action was decided on by the space assignment committee after reservations were received for over 86,000 square feet of space, more than was provided for on the original plan. Although the show will not be held until the week of October 21, advance space reservations are now far in excess of any pre... ...22 year hist...

...NEWS THAT MEANS MORE SALES FOR METAL EXPOSITION EXHIBITORS

When this story broke in the newspapers, metal men forgot political news for a while—forgot World War No. 2—and started to speculate about this biggest National Metal Exposition which will open in October at Cleveland.

If this is the biggest Metal Exposition in 22 years, they said, we'd better be there to get our share of the business. Because last year 33,000 of our best prospects attended the Metal Exposition.

And so . . . to the Metal Exposition headquarters in Cleveland . . . have come letters, wires and telephone calls by the dozens. Reserving spaces for big and little companies who sell the metal industry everything from pyrometers to tons of steel.

But there are still plenty of good spaces left at the regular $1.00 a square foot rate because Cleveland's ample Public Auditorium provides more than 150,000 square feet for the Metal Exposition.

So write or wire collect today for full particulars. Address: W. H. Eisenman, Director, National Metal Exposition, 7301 Euclid Avenue, Cleveland, Ohio.

The WORLD'S GREATEST EVENT IN THE METAL INDUSTRY 70% NEW ATTENDANCE EACH YEAR

COOPERATING SOCIETIES

American Society for Metals
Wire Association
American Welding Society
Iron & Steel Division and Institute of Metals Division of the American Institute of Mining & Metallurgical Engineers

NATIONAL METAL EXPOSITION

AND METAL CONGRESS

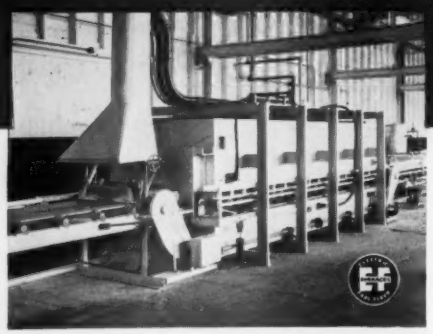
OCTOBER 21-25, 1940 *Cleveland, Ohio*

MANAGED BY AMERICAN SOCIETY FOR METALS

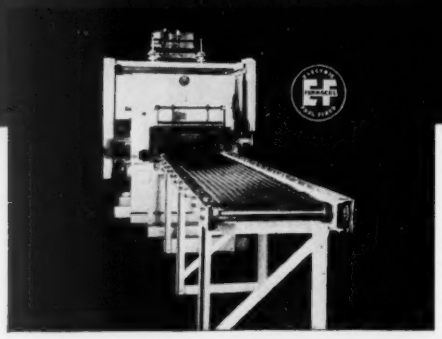
These Three Furnaces

* ONE GAS FIRED
* ONE ELECTRIC *and*
* ONE COMBINATION FURNACE

All Bright Annealing Tube



E. F. Continuous Electric Furnace Bright Annealing 40,000 lbs. steel tubing per day.

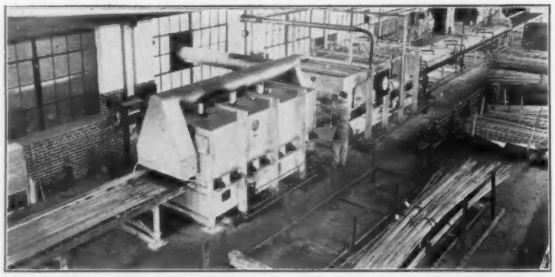


Gas Fired Continuous Bright Annealing Furnace with E. F. recuperative type radiant tubes.

While the three furnaces shown are all annealing steel tubing in straight lengths, the problem at each of the three plants was entirely different—requiring somewhat different treatments and three different types of furnaces.

The type furnace and heating medium we recommended in each case was determined by the results desired, the power and fuel available and cost of same, the production required and other local conditions at the customer's plant.

As designers and builders of both electric and fuel fired equipment our engineers were in position to make a thorough study of each customer's problem and recommend and build the best size and type furnace for each specific job.



An E. F. Combination Gas-Electric installation Bright Annealing High Carbon Alloy Seamless tubing — 2000 lbs. per hour.

Each of the E. F. furnaces installed is producing the results for which it was designed.

We have made numerous other interesting installations for processing wire, strip, tubing and other products.

Permit us to study and submit proposal on your next heat treating or furnace problem.

We build Gas Fired, Oil Fired and Electric Furnaces—For any Product, Process or Production.

The ELECTRIC FURNACE Co.

ELECTRIC & FUEL FIRED *Furnaces*

SALEM, OHIO